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DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

FINAL REPORT

DECEMBER 1977

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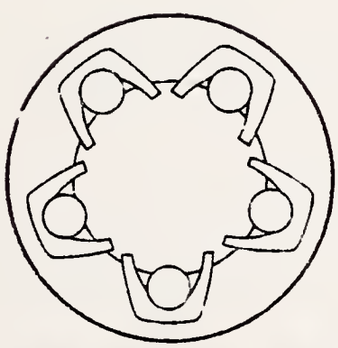

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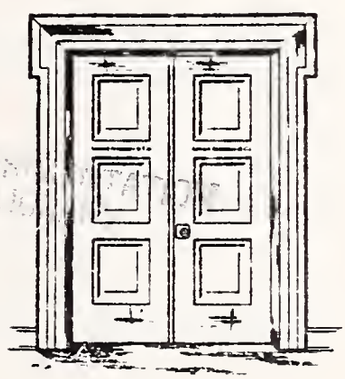

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HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

FINAL REPORT

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HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

EXECUTIVE SUMMARY

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STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

EXECUTIVE SUMMARY

A. OBJECTIVES

The primary objective of this study was to obtain financial and related data on certain categories of hospital-based physicians (HBPs), and to analyze these data in terms of how both HBP earnings and HBP contractual relationships vary according to characteristics of the hospitals and the geographic areas in which they are located. These characteristics include, among others: teaching status, number of hospital beds, urban or rural location, and the extent to which the hospital is reimbursed by third-parties on a cost-related basis. Phase I of the study addressed this objective for three HBP specialties--radiology, pathology, and anesthesiology.

As the study progressed, the objectives were refined based upon our preliminary findings. Phase II of the study addressed these refinements. The objective of the first refinement was to extend the Phase I descriptive analysis into two additional HBP specialties--cardiology and emergency room. The objective of the second refinement was to gain a better understanding of the factors affecting the amounts of compensation received by HBPs, and the types of arrangements under which they are compensated, by means of an iterative multivariate analysis. The objective of the third refinement was to examine on an exploratory case study basis how

New York State's prospective reimbursement system has affected HBPs and the hospitals in which they practice over the years since 1970, to explore the impact of possible policy changes, and to verify some of the preliminary findings of the study. The fourth refinement was to provide the Office of Policy, Planning, and Research with recommendations for further research in any area related to the study.

EXECUTIVE SUMMARY

B. SCOPE

The study consisted of two phases. Phase I of the study involved a major data collection effort which covered 120 hospitals, 600 departments and 400 contracts. The data, covering each hospital's fiscal year ended in 1975, included 2,600 hospital-based physicians (HBPs) who worked 1,300 full-time equivalent (FTE) man-years in the participating hospitals. There were 500 radiologists, 425 pathologists, 291 anesthesiologists, 612 cardiologists, 418 emergency room physicians, and 382 other specialists in the sample. Phase I included a comprehensive descriptive analysis of the relationships among the amount of compensation per FTE HBP, the types of compensation arrangements, and various hospital, departmental, contractual and other characteristics for three HBP specialties--radiology, pathology and anesthesiology. Phase I also included a descriptive analysis of 185 written contracts between hospitals and either individual or groups of HBPs. This aspect of the study is described in Segment II of this report.

The first aspect of the Phase II work was the extension of the Phase I descriptive analysis into two additional specialties--cardiology and emergency room. Segment III of this report covers this aspect of the study.

The second aspect of Phase II applied multivariate analysis to the data collected during Phase I for four specialties--radiology, pathology, cardiology and emergency room. The descriptive analysis

described above was limited to tabular comparisons of pairs of variables. The multivariate analysis performed in this segment made it possible to simultaneously analyze the effects of a number of different variables on either the amount of compensation per FTE HBP or the type of compensation arrangement. This analysis is further described in Segment IV of this report.

The third aspect of Phase II, the exploratory case studies of the effects of prospective reimbursement on HBP compensation and practice arrangements in New York State, consisted of the collection of information from ten New York State hospitals through interviews and the accumulation of financial data during visits to the hospitals. These data were then examined to determine how the New York prospective reimbursement system has affected HBPs and the hospitals in which they practice. The interviews conducted during these exploratory case studies were also used to verify certain key findings and assumptions of previous portions of the study. In addition, the potential impact of policy changes affecting HBPs was explored. This aspect of the study is described in Segment V of this report.

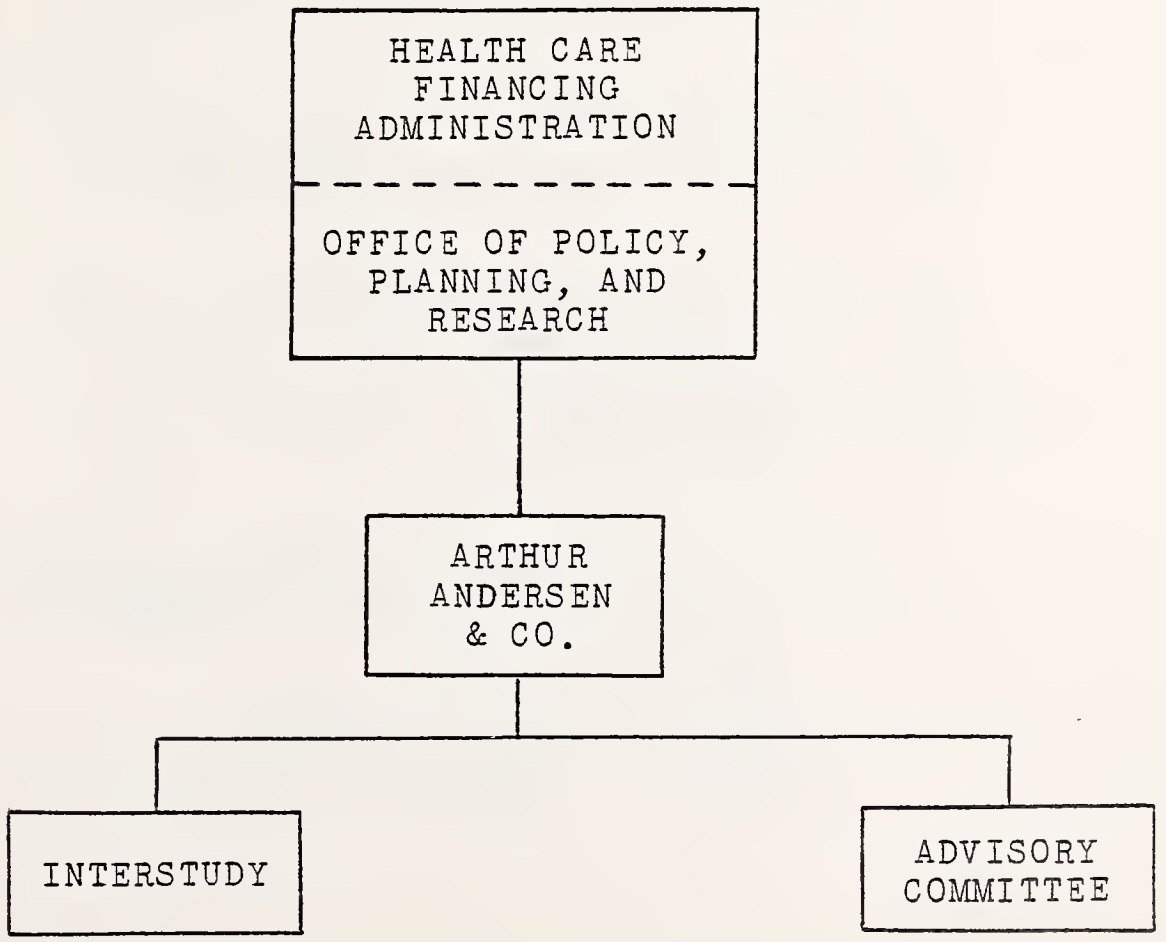
Finally, throughout the study a number of areas for possible further research were identified. Our recommendations for further research are presented in Segment VI of this report.

C. PROJECT ORGANIZATION

The study is a joint effort of Arthur Andersen & Co., the prime contractor, and InterStudy, the major subcontractor. At critical points throughout the project, the work was reviewed by personnel from the Office of Policy, Planning, and Research of the Health Care Financing Administration and by an advisory committee created for the study. The project organization chart in Exhibit C-1 depicts the relationship of these groups.

EXHIBIT C-1

PROJECT ORGANIZATION



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The exploratory case studies of the impact of prospective reimbursement on HBPs in New York State (see Segment V) were greatly

aided by the cooperation of Mr. Morton Ganeles of the Hospital Association of New York State (HANYS). The HANYS assistance consisted of identifying potential hospital participants, making the initial contact with them, and recommending that they participate. In addition, HANYS also assisted in our understanding and interpretation of the various prospective reimbursement (PR) regulations and their ramifications in New York State.

EXECUTIVE SUMMARY

D. MAJOR FINDINGS

The four segments that follow this Executive Summary represent the study deliverables that related to Phase I and the three aspects of Phase II. These reports contain comprehensive discussions of major findings for each segment of the study. The purpose of this section is to summarize the major findings for each of these four segments. Included with each findings summary is a discussion of qualifications that should be considered when examining the findings.

Descriptive Analysis of Radiology, Pathology, and Anesthesiology

Before presenting the major findings from this aspect of the study, it is important that several key definitions and underlying data characteristics be stated. Each of these issues is discussed more thoroughly on the pages indicated in parentheses.

- The only hospital-based physician (HBP) compensation data available to us was that paid by the sample hospitals. Other possible sources of income (such as other hospitals, private practice, professorships, publications and consulting fees) are not reflected in our findings, except to the extent that they may be incorporated in the conversion to full-time equivalent earnings (page II-17).

- To facilitate comparative analysis, the compensation amounts reported for all HBPs who worked less than full-time in a sample hospital have been converted to a full-time equivalent (FTE) basis (pages II-16 to II-18).

- The analysis excludes all HBPs who billed patients directly, because in these cases the sample hospitals had no knowledge of the HBPs' earnings (pages II-18 and II-19).

- In general, the term "percentage arrangement(s)" includes all arrangements in which physician remuneration is calculated by applying a percentage factor (which can vary considerably among contracts) to either gross or net departmental revenue. The differences between gross and net departmental revenue also vary among contracts, but often include deductions for departmental bad debts, contractual allowances, charity care, hospital employee services and professional courtesies (pages II-29, II-68, and II-69).

- The analysis includes comparisons of the remuneration of salaried HBPs versus those on percentage arrangements. These remuneration amounts may not be directly comparable because of the difference between "net" and "gross" income. The remuneration paid under a salary arrangement often represents "net" income to the HBP. In the case of a percentage arrangement the remuneration usually represents "gross" income, out of which the HBP typically must pay for a variety of fringe benefits and malpractice insurance, and occasionally for certain costs of operating the department. However, one of the major findings of several segments of this study is that the additional costs borne by HBPs on percentage contracts are not large enough to account for the significantly higher remuneration received under percentage arrangements versus salary arrangements (pages II-19 to II-20).

With these explanations in mind, the major findings of the analysis of the descriptive tables for the specialties of radiology, pathology, and anesthesiology are summarized below:

- The three specialty departments contribute significantly to the total gross charges (23%) and total fully-allocated costs (17%) of their hospitals.

- Total HBP remuneration represents a significant portion of the total direct costs in these departments (ranging from under 30% in pathology to over 70% in anesthesiology).

- Average earnings per FTE HBP were: radiologists--$103,200, pathologists--$98,400, and anesthesiologists--$80,000.

- The average FTE earnings of HBPs are closely associated with the type of compensation arrangement. Salary arrangements are associated with lower average FTE earnings (e.g., $52,600 for radiologists), and

percentage arrangements with higher average FTE earnings (e.g., $124,400 for radiologists).

- Salaried physicians are very prevalent in teaching hospitals, and HBPs in teaching hospitals thus have lower average FTE earnings than in nonteaching hospitals.

- HBPs in small hospitals tend to earn more on an FTE basis than those in medium and large hospitals.

- Average FTE earnings vary by region, with generally higher averages in the West (e.g., $141,600 for pathologists) and North Central regions, and lower ones in the South and Northeast (e.g., $71,300 for pathologists).

- HBP average FTE earnings appear to be higher the greater the share of the hospital's revenues from cost reimbursement payors.

- The average FTE earnings of HBPs are closely associated with the gross revenues and net revenues (gross revenues less allowances, discounts, bad debts, and charity) of the departments in which they work.

Some qualifications should also be considered when reviewing the findings for the contract analysis. First, since our analysis was restricted to written contracts, the findings may be somewhat biased. Second, since each contract is unique in some significant aspect and since they vary widely in their formality and specificity, generalization was difficult. Finally, our sample of contracts may not be representative of all HBPs because it was not selected randomly.

The major findings of our contract analysis are summarized below:

- A significant percentage of the arrangements between hospitals and HBPs are oral. Written contracts account for less than half of the total number of arrangements between the HBPs and hospitals in our sample.

- Salary compensation arrangements tend to take an oral form; percentage arrangements are more likely to be written contracts. As a result, the contracts which were analyzed were predominantly percentage arrangements and our findings apply primarily to them.

- Approximately 75% of the contracts were with group practices or physicians who might form a group practice.

- The primary finding in relation to our analysis of the descriptive tables was that HBPs compensated under a percentage arrangement tend to receive far fewer fringe benefits, and pay more of their department's expenses, than do HBPs compensated under a salary arrangement. This finding tends to reduce some of the significance of the large differences found in our descriptive analysis between the average FTE compensation of these two types of compensation arrangements.

Descriptive Analysis of
Cardiology and Emergency Room

The explanations presented above for the Phase I descriptive analysis also apply to the descriptive analysis of cardiology and emergency room performed in Phase II.

The major findings of the descriptive analysis of the cardiology and emergency room specialties are the following:

- The two specialty departments contribute approximately 6% to the total gross charges and approximately 5% to the total fully-allocated costs of their hospitals.

- Total HBP remuneration represents a significant portion of the total direct costs in these departments (approximately 65% in cardiology and 49% in the emergency room).

- The average FTE compensation amounts for cardiologists and emergency room physicians in the sample are considerably lower than those found earlier for radiology, pathology and anesthesiology. The average for cardiology is $63,000; the average for emergency room is $54,700.

- As with the other specialties, the type of compensation arrangement appears to be closely associated with the

amount of compensation--the percentage arrangements are associated with higher average FTE compensation amounts (e.g., $74,900 for emergency room HBPs) than are the salary arrangements (e.g., $40,400 for emergency room HBPs).

- The findings relating amount and type of compensation to hospital characteristics such as teaching status, bed size and SMSA location did not reveal any significant differences. There is a slight tendency for FTE compensation amounts to be higher in nonteaching rather than in teaching institutions. In contrast to the findings for the other specialties, FTE compensation amounts were, on the average, lowest in small hospitals. Little difference was found in average FTE compensation amounts between SMSA and non-SMSA locations, although the sample sizes in the non-SMSA areas were quite small.

- Average FTE compensation amounts vary by region, with generally higher averages in the West (e.g., $67,100 for emergency room HBPs) and North Central regions, and lower ones in the South and Northeast (e.g., $38,300 for emergency room HBPs).

- With regard to cost reimbursement and prospective rate setting, the data indicate an association between high levels of cost reimbursement and the absence of prospective rate setting on the one hand, and higher average FTE compensation amounts on the other hand. However, as noted in the text, these differences in averages can be due to many other factors in addition to cost reimbursement and prospective rate setting.

- Finally, as is the case with the specialties examined previously, the FTE compensation amounts of the HBPs are positively associated with the revenues per FTE of their departments. As these FTE revenues increase, so do the FTE compensation amounts of the HBPs.

Multivariate Analysis of Radiology, Pathology, Cardiology and Emergency Room

With regard to the multivariate analysis, two qualifications should be kept in mind. First, the wide variety of HBP compensation arrangements meant that we could use only fairly small samples when we focused on pure salary and pure percentage departments.

Secondly, there were statistical problems caused by the high intercorrelation of variables (multicollinearity) that made a causal interpretation of the role of specific variables difficult.

The major findings for the multivariate analysis are detailed below. The following general findings apply primarily to the specialties of radiology and pathology, since we conducted only overview analyses of the cardiology and emergency room specialties.

- Regression results for amount of compensation reinforce the findings from the descriptive analyis that, even after controlling for a considerable number of other factors, the difference between the salary arrangement and the percentage arrangement remains. The difference in compensation amounts appears to be greater than could be accounted for by the fact that HBPs under a percentage arrangement usually have to pay for their own fringe benefits, malpractice insurance and occasionally certain costs of operating their departments.

- Hospital and area characteristics are more powerful in explaining differences in the type of compensation arrangement between hospitals and HBPs than they are in determining the amount of compensation. The variables which are statistically significant generally conform to the hypothesis that labor market conditions and bargaining power are major factors in the determination of the type of compensation arrangement. The most important characteristics were: region, teaching status and hospital size, and the physician-to-bed ratio. These were also the primary variables for which major differences were revealed in the earlier descriptive analysis.

- Certain hospital and area characteristics, which in the descriptive analysis appeared to be related to differences in amount of compensation and type of arrangement, were not statistically significant in the multivariate analysis. Examples of these variables are SMSA location, the percentage of hospital revenues obtained through cost reimbursement, and the percentage of hospital revenues controlled by a formal prospective rate setting program.

- Using the cost after stepdown variable as our proxy measure for the complementary inputs with which the HBP

works, it does not appear that the percentage arrangement leads to a greater use of complementary inputs than does the salary arrangement.

. The major variables in statistically determining the amount of compensation of HBPs are the type of compensation arrangement and our measure of complementary inputs.

. The role played by our measure of complementary inputs in determining the amount of HBP compensation differs according to the type of compensation arrangement. For those under a percentage arrangement the amount of compensation and the cost after stepdown are directly proportional to one another. In contrast, however, for those on a salary, the amount of compensation does not rise as other departmental costs rise.

Exploratory Case Studies of the Effects of Prospective Reimbursement on HBP Compensation and Practice Arrangements

The third segment of Phase II, the exploratory case studies of prospective reimbursement (PR) in New York State, revealed several significant findings. However, four qualifications should be kept in mind. First, the sample was selected through HANYS and therefore was not random. The sample reflects a bias toward large, urban hospitals with relatively strong financial positions. Second, the interviews included only hospital administrators and physicians. As a result, there is a bias toward their point of view. There were no interviews included to account for the State's viewpoint. Third, the findings are primarily the result of conversations with those in administration and those physicians that were available to speak with us on the day we visited each hospital. As a result, the types of people interviewed varied from hospital to hospital, and the findings may suffer some bias. Last, there is a possibility of a causal fallacy in the study. Despite our attempts to identify the effects of PR, other independent factors may well influence some of the variables examined.

The major findings of the exploratory case studies in New York State were:

. In terms of its impact upon the HBPs, the PR system has-

  - contributed to a tendency for the hospitals to limit HBP remuneration,

  - created incentives for the HBPs to shift to a direct billing arrangement, and

  - helped create an atmosphere that is not conducive to attracting HBPs to the State, or retaining those that currently practice in New York.

. In terms of specific areas of impact in the hospitals, the hospital administrators voiced their opinions that the PR system has-

  - helped cause cutbacks in teaching programs,

  - improved the hospitals' dealings with suppliers,

  - strengthened the hospitals' bargaining position with HBPs and other hospital personnel,

  - limited capital expenditures in many areas,

  - contributed to the cutback and elimination of services,

  - produced behavior by the hospitals that is inefficient in terms of the total health care system,

  - contributed to the reduction of the hospitals' nonoperating reserves, and

  - contributed to a trend that may have a negative effect on the quality of care in some departments.

. In terms of validating several key findings and assumptions of earlier segments of the study-

  - the use of a 2,080 hour year (40 hour week) as a definition of one FTE HBP was widely accepted by administrative personnel, but felt to be low by many HBPs,

  - the approach used to convert all HBP compensation to an FTE basis was generally accepted,

- our understanding of the types of fringe benefits received by salaried HBPs and expenses paid by HBPs on percentage arrangements was confirmed,

- the cost of annual malpractice insurance premiums paid by radiologists, pathologists and emergency room physicians ranged from $600 to over $3,000, and

- in no case did the interviewed HBPs on percentage arrangements pay for any of the significant operating expenses of their departments out of the compensation they received from the hospitals.

. In terms of the acceptability of several possible policy alternatives-

- the possibility of eliminating percentage arrangements was generally accepted,

- the possibility of limiting HBP compensation to salary plus legitimate expenses met mixed reactions, and

- the possibility of requiring the disclosure of each HBP's total income was uniformly opposed.

. Despite the fact that the majority of the hospitals interviewed were in relatively strong financial position, many had suffered operating losses during the past three years.

. The impact of the New York PR system has becom significantly more severe in the past two to three years.

EXECUTIVE SUMMARY

E. RECOMMENDATIONS FOR FURTHER RESEARCH

Recommendations from the Descriptive and Multivariate Analyses

In this study we had access to much of the information available on hospital-based physicians (HBPs) from hospital sources. Despite this, several important questions remain unanswered. To answer them, data from other sources and, probably, totally new data will be required. The areas of most pressing need for additional data and subsequent research, particularly for radiology and pathology, are the following:

- The types, quantities, prices, and unit costs of the various services provided by HBPs cannot be adequately measured as of now. Such output measures as are available (i.e., exams, procedures, tests) are too aggregative and not uniformly applied across hospitals. Thus, it is very difficult to link the amount and type of compensation to the actual services provided and their cost to the public. Such information is necessary, however, before judgments can be rendered regarding the reasonableness of compensation amounts.

- Since these segments focused on the hospital as the main source of data, HBP income from other sources was not available. We attempted to adjust for this through the use of the full-time equivalent measure, but the accuracy of this procedure is unknown. Since, in our various samples, from one-half to three-quarters of the HBPs worked less than full-time at the hospital from which we obtained data, this is a potentially serious problem. In order to obtain more complete information, other data sources will be necessary (Medicare and Medicaid data, Internal Revenue Service data, etc.).

- Also needed are better estimates of the actual number of hours worked by HBPs and the nature of that work (e.g., patient care, administration, teaching). However, such

information may be impossible to obtain without some form of direct observation or time measurement study. This would also seem to imply an intensive study of a small number of HBPs, in which case the generalizability of the results would be open to question.

. Direct measures of fringe benefit costs and other expenses paid by HBPs who are on percentage arrangements are also needed in order to verify our conclusion that the difference in amount of compensation between those on percentage and those on a salary arrangement was greater than could be attributed to these extra expenses. This is one area on which information might be fairly easy to obtain directly from the HBP (for instance, via a survey).

. The incentives and motivations of HBPs is another area in which much remains to be learned. Further research could attempt to answer such questions as: Why do HBPs seek (or accept) one type of contractual arrangement over another? What factors influence changes in contractual arrangements? Does the type of contractual arrangement affect HBP behavior in such areas as number of hours worked, productivity, and allocation of time (among patient care, administration, research, teaching, etc.)? These questions involve a variety of complex issues, but the answers would be extremely useful to policymakers.

. The impact of interns and residents tends to complicate any analysis of HBPs in teaching hospitals. Although the direct salary costs associated with interns and residents are usually available, it is often difficult to determine how their time (and its cost) is allocated throughout the hospital. As a result, it is difficult to quantify the effect of interns and residents on the productivity of any department. Further study of the compensation levels of interns and residents and, more importantly, of their impact on departmental volumes and, indirectly, on HBP compensation, could be very valuable.

In addition, we believe that if major changes are contemplated in the way HBPs are reimbursed under public programs, (such as the proposed Talmadge Bill), these changes should be pretested in some way before being implemented. The great variety of compensation arrangements now in existence, coupled with the administrative complexity of implementing limits or controls of various types on amount of compensation, necessitates, we believe, a cautious approach.

Recommendations from Exploratory Case Studies of the Effects of Prospective Reimbursement on HBP Compensation and Practice Arrangements

In the last segment of the study, it was found that the prospective reimbursement (PR) system in the State of New York has had a pronounced effect upon some of the HBPs and hospitals studied. This effect and the ramifications it might have for the health care system in the State of New York (and/or other states with PR systems) could be researched further in several areas:

- One area for possible research is the tendency for the HBPs in New York State to shift to direct billing as the pressure to curtail hospital costs is increased. If this trend were to continue, the physician component of cost for hospital care would become more and more difficult to control. This might result in higher total health care costs to the public.

- A second area is that of the HBPs' inadequate knowledge of the PR system and its purpose. The HBP is relatively uninformed about PR and therefore has difficulty coming to grips with its constraints and incentives. In its current state, PR creates a confrontation between the hospital administrator and the HBP that might have a significant impact on the health care system.

- Third, further study might be directed toward the effect PR has had upon the various payors. Some hospitals have considered terminating their contracts with Blue Cross and some administrators claimed that the patient with commercial insurance, or who self-pays, is forced to pay higher rates for hospital service due to partial reimbursement of actual costs under PR.

- A fourth area that might warrant further study is that of the overall financial condition of the hospitals in New York State. Many of the administrative personnel who were interviewed felt that their hospitals were being weakened financially as a result of PR.

- The final area for further investigation is that of the effect PR has had upon quality of care in the State. The hospitals have cut back in many areas in an attempt to reduce costs. Many of the interviewees felt this will or already has significantly affected quality of care. Any research of this nature would require the development of a complex definition of quality medical care.

Some specific suggestions as to what might be analyzed by future study in each of the above areas are presented in Segment VI of this report.

V. N.Y. CASE STUDIES

II. DESCRIP. ANALYSIS
- RAD., PATH. & ANES.

- CARDIOLOGY & E.R.

HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

DESCRIPTIVE ANALYSIS OF RADIOLOGY, PATHOLOGY, AND ANESTHESIOLOGY

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STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

DESCRIPTIVE ANALYSIS OF RADIOLOGY, PATHOLOGY, AND ANESTHESIOLOGY

A. INTRODUCTION

Objectives

The purpose of this study was to obtain financial and related data on certain categories of hospital-based physicians (HBPs), and to analyze these data in terms of how both HBP earnings and HBP contractual relationships vary according to characteristics of the hospitals and the geographic areas in which they are located. These characteristics include, among others: teaching status, number of hospital beds, urban or rural location, and the extent to which the hospital is reimbursed by third-parties on a cost-related basis.

Scope

The scope of work for this phase of the project included the following major components:

1. The selection of a representative sample of 120 hospitals.
2. The development of a research design and data acquisition plan.
3. The collection of data covering each hospital's fiscal year ended in 1975.
4. The development, interpretation and presentation of descriptive tables on HBP earnings, contractual relationships and closely related items.
5. The preparation of an interim report for delivery to the Health Care Financing Administration.

This part of the study focuses on the specialties of radiology, pathology and anesthesiology, and examines, in particular, the earnings such specialists obtain through their work for hospitals and the nature of their contractual relationships with the hospitals.

DESCRIPTIVE ANALYSIS OF RADIOLOGY, PATHOLOGY, AND ANESTHESIOLOGY

B. PROVIDER PARTICIPATION SUMMARY

Sampling Procedures

The sampling procedures outlined in this section were designed to accommodate the following major characteristics: (1) census region, (2) hospital bed size, (3) hospital teaching status, (4) hospital for-profit/not-for-profit status, and (5) whether the hospital is or is not in a Standard Metropolitan Statistical Area (SMSA).

The resulting sample consists of 120 hospitals. In order to derive the greatest utility from the sample, we concentrated on only certain major types of hospitals. The first step of the sampling procedure was to eliminate hospitals providing other than general acute care, such as chronic, skilled nursing, and extended care; psychiatric; tuberculosis and other respiratory hospitals. These hospitals were eliminated in order to minimize the sample's heterogeneity across variables other than those of prime interest in the study.

In the second step of the sampling procedure, hospitals were identified according to the following characteristics found in the American Hospital Association (AHA) Guide to the Health Care Field, 1975 Edition:

1. Size (number of general service beds)
2. For-profit/not-for-profit status
3. Teaching/nonteaching status[1]
4. SMSA/non-SMSA location

The hospitals were then grouped into the four census regions: northeast, north central, south, and west; and three size categories based on the number of general service beds: small (fewer than 100 beds), medium (100 to 299 beds), and large (300 or more beds).

Sample Composition

The sample was selected in such a way as to approximate national norms for the four census regions. Table B-1 shows the number of hospitals selected by region and by size (see above for definitions of size terms).

TABLE B-1. HOSPITALS BY REGION AND SIZE

(AHA Registered, Nongovernment, Short-Term)

	Sample				
	Bed Size				Total
	Small	Medium	Large	Total	Hospitals[2]
Northeast	3	10	9	22 (18%)	844 (21%)
North Central	13	14	9	36 (30%)	1,190 (29%)
South	4	15	13	32 (27%)	1,216 (30%)
West	9	15	6	30 (25%)	789 (20%)
Total	29	54	37	120 (100%)	4,039 (100%)

[1]For a hospital to be designated a teaching hospital, one or more of the following approvals was necessary: (1) residency or internship approved by the American Medical Association (AMA) (November, 1974) or by the American Osteopathic Association (January, 1975); (2) medical school affiliation, reported by the AMA (November, 1974); (3) member of Council of Teaching Hospitals of the Association of American Medical Colleges (January, 1975).

[2]American Hospital Association, Hospital Statistics, 1972.

Next, twelve for-profit hospitals were chosen for the sample. Table B-2 shows the number of sample hospitals which are for-profit, by region. Because, nationally, the for-profit hospitals are concentrated in the south and west, most of the for-profit hospitals in our sample are in these two regions.

TABLE B-2. HOSPITALS BY REGION AND BY FOR-PROFIT, SMSA, AND TEACHING STATUS[1]

	Sample		
	For-Profit Hospitals	Hospitals in SMSAs	Teaching Hospitals
Northeast	0	19	12
North Central	1	23	9
South	6	30	14
West	5	24	5
Total	12	96	40

After the sample was selected according to size, region, and for-profit/not-for-profit status, it was reviewed in terms of two other criteria, SMSA/non-SMSA location and teaching/non-teaching status. Table B-2 presents the number of sample hospitals which are in SMSAs as well as the number of teaching hospitals. The table shows that both are adequately provided for in the sample.

[1] Figures represent AHA registered, short-term hospitals, American Hospital Association, Hospital Statistics, 1972.

C. DATA COLLECTION

This section presents a summary of the types of data that were collected for this phase of the study and the sources from which they were obtained. These topics are discussed below under the following headings:

. Types of Data

. Sources of Data

Types of Data

A wide variety of data was collected from each of the 120 participating hospitals. A detailed list of all data elements is presented in Appendix C-1. The list below summarizes the major categories of data that were collected:

1. Hospital characteristics (size, teaching status, profit status, etc.)
2. Hospital reimbursement data (sources, percentage distribution, prospective/retrospective, etc.)
3. Hospital revenues, expenses and capitalization
4. Hospital statistics (patient days, average length of stay, occupancy rate)
5. Census data and health care statistics for the county in which the hospital is located
6. Census and physician data for the SMSA (if applicable) in which the hospital is located
7. Departmental revenues and expenses

8. Departmental operating data (units of service and hours of operation)

9. Departmental physician counts, including full-time equivalents

10. Departmental physician compensation data, including methods and amounts

11. Contract terms (effective date, length, method and frequency of payment, etc.)

12. Contract physician counts, including full-time equivalents

13. Contract physician compensation data, including methods and amounts

Sources of Data

The data for the study were obtained from various sources on an anonymous basis per our contract with the HCFA. The specific source of each data element is presented in Appendix C-1. The list below summarizes the major categories of data sources:

1. Medicare Cost Reports for each hospital's fiscal year ended in 1975 (hospital and departmental financial and statistical data)

2. American Hospital Association Guide to the Health Care Field, 1975 edition (hospital characteristics)

3. U.S. Bureau of the Census, County and City Data Book, 1972 (county and SMSA census data)

4. U.S. Department of Health, Education and Welfare, Hospitals: A County and Metropolitan Area Data Book, 1972 (county health care statistics)

5. American Medical Association, Physician Distribution and Medical Licensure in the U.S., 1974 (SMSA physician data)

6. Hospital internal records, audit reports and other working papers for the fiscal year ended in 1975 (hospital reimbursement data, hospital and departmental financial and operating data, physician counts and compensation data, contract terms)

7. Contracts (or other written agreements) between each hospital and its HBPs (contract terms, physician counts and physician compensation data)

DATA ELEMENTS AND SOURCES

Data Element	Source
A. HOSPITAL DATA	
1. Record Identification	Assigned Codes
2. Sequence Number	Assigned Codes
3. Number of Beds (General Service only)	Hospital Statistics-Medicare Reports
4. Size Classification Code	Hospital Field 3 (No. beds)
5. Teaching/Nonteaching Code	Ref. 1*
6. Type of Hospital Code (Type of Care Provided)	Hospital Statistics-Medicare Reports
7. Complexity of Service	Ref. 1*
8. For-Profit/Not-For-Profit	Ref. 1*
9. Cost Allocation Method	Hospital Data
10. Total % for Prospective and Retrospective	Hospital Data
11. % of Patient Revenues or to Days and Prospective/ 16. Retrospective Code from:	Hospital Data
11. Medicare	
12. Medicaid	
13. Blue Cross	
14. Commercial Insurance	
15. Self Pay	
16. Other	
17. Total Inpatient Revenues	Medicare Cost Reports
18. Total Outpatient Revenues	Medicare Cost Reports
19. Total Patient Revenues	Medicare Cost Reports
20. Allowances and Discounts on Patient Accounts	Medicare Cost Reports
21. Net Patient Revenues	Medicare Cost Reports
22. Total Operating Expenses	Medicare Cost Reports
23. Net Income from Service to Patients	Medicare Cost Reports
24. Other Income	Medicare Cost Reports
25. Other Expenses	Medicare Cost Reports
26. Net Income for the Period	Medicare Cost Reports
27. Cost Reporting Period	Hospital Statistics-Medicare Reports
28. Total Inpatient Days	Hospital Statistics-Medicare Reports
29. Average Length of Stay	Hospital Statistics-Medicare Reports
30. Occupancy Rate	Hospital Statistics-Medicare Reports
31. Total Fixed Assets	Hospital Data
32. Accumulated Depreciation	Hospital Data
33. Total Value of Leased Equipment	Hospital Data

*See Part D, Page II-12.

Data Element	Source
34. Region/State Code	Assigned Codes
35. SMSA/Non-SMSA Code and Group	Refs. 2 and 3*
36. Per Capita Income in County	Ref. 4*
37. % of Families Below Low Income Level	Ref. 4*
38. Population in County	Ref. 4*
39. Number of Hospitals in County	Ref. 5*
40. Total No. of Hospital Beds in County	Ref. 5*
41. Occupancy Rate for County	Ref. 5*
42. to 44. Not used	
45. Total Physicians in Patient Care for County	Ref. 6*
46. Total HBPs in SMSA	Ref. 7*
47. Anesthesiologists in Patient Care in SMSA	Ref. 7*
48. HBP Anesthesiologists in SMSA	Ref. 7*
49. Pathologists in Patient Care in SMSA	Ref. 7*
50. HBP Pathologists in SMSA	Ref. 7*
51. Radiologists in Patient Care in SMSA	Ref. 7*
52. HBP Radiologists in SMSA	Ref. 7*
53. Population in SMSA	Ref. 4*
B. DEPARTMENTAL DATA	
1. Record Identification and Sequence Number	Assigned Codes
2. Type of Department Control Code	Hospital Data
3. No. of Contracts Coded for the Department	Count of Contracts
4. No. of Department Heads (absolute, full-time and FTE)	Hospital Data
5. No. Other HBPs in Department (absolute, full-time and FTE)	Hospital Data
6. Total Department Heads and Other HBPs (absolute, full-time and FTE)	Hospital Data
7. Units of Service	Hospital Data
8. Units of Measure Code	Hospital Data or Audit Working Papers
9. Gross Inpatient Revenues	Medicare Cost Reports
10. Gross Outpatient Revenues	Medicare Cost Reports
11. Total Gross Patient Charges	Medicare Cost Reports

*See Part D, Page II-12.

Data Element	Source
12. Overall Contractual Allowances and Bad Debts for Department	Calculation Hospital Field 20 x (Department Field 11 ÷ Hospital Field 19)
13. Net Patient Revenues	Calculation Field 11-Field 12
14. Salary Expense for Department	Medicare Cost Reports
15. Expenses Other than Salaries	Medicare Cost Reports
16. Reclassifications	Medicare Cost Reports
17. Reclassified Trial Balance	Medicare Cost Reports
18. Adjustments	Medicare Cost Reports
19. Net Expenses for Cost Allocation	Medicare Cost Reports
20. Total Allocated Costs	Calculation Field 21-Field 19
21. Total Fully Allocated Costs	Medicare Cost Reports
22. Net Income from Service to Patients	Calculation Field 13-Field 19
23. Remuneration for HBP: Patient Care	Medicare Cost Reports
24. Remuneration for HBP: Nonpatient Care	Hospital Data
25. Total Remuneration Paid to HBPs	Hospital Data
26. Net Income of Service to Patients before Remuneration to HBPs	Calculation Field 22+Field 24
27. Department Indicator Code	Hospital Data
28. Salaries Paid to HBPs if Applicable	Contract or Hospital Data
29. Compensation as a % of Gross Revenues if Applicable	Contract or Hospital Data
30. Compensation as a % of Net Revenues if Applicable	Contract or Hospital Data
31. Management Fees if Applicable	Contract or Hospital Data
32. Other Compensation if Applicable	Contract or Hospital Data
33. Billing Code	Hospital Data
34. Price Change Authority Code	Hospital Data
35. Hours of Operation	Hospital Data
C. CONTRACT DATA	
1. Record Identification	Assigned Codes
2. Sequence Number	Assigned Codes
3. Contract Code	Contract or Hospital Data
4. Private Practice Allowed	Contract or Hospital Data
5. Length of Contract (months)	Contract
6. Contract Approval Code	Contract or Hospital Data

Data Element	Source
7. No. of Department Heads on Contract (absolute, full-time and FTE)	Contract or Hospital Data
8. No. Other HBPs on Contract (absolute, full-time and FTE)	Contract or Hospital Data
9. Total Department Heads and HBPs on Contract (absolute, full-time and FTE)	Contract or Hospital Data
10. Method of Compensation Code	Contract or Hospital Data
11. Contract Payment Terms Code	Contract or Hospital Data
12. Annualized/Fiscal Code	Contract or Hospital Data
13. % of Time Devoted to Patient Care	Contract or Hospital Data
14. % of Time Devoted to Nonpatient Care	Contract or Hospital Data
15. Effective Date of Basic Contract	Contract
16. Salary Component Amount if Applicable	Contract or Hospital Data
17. Compensation Component if % of Gross Revenues	Contract or Hospital Data
18. Compensation Component if % of Net Revenues	Contract or Hospital Data
19. Management Fees, if Applicable	Contract or Hospital Data
20. Other Compensation Component, if Applicable	Contract or Hospital Data
21. Total Compensation per Contract	Contract or Hospital Data
22. Codes (applicable to % of Net Contracts only) Indicating if the Following Cost Elements were Included in Calculation of Net:	Contract or Hospital Data
22. Technician Salaries	
23. Other Indirect Costs	
24. Bad Debts (including the % rate used)	
25. Depreciation	
26. Rent	
27. Other Direct Costs	
28. Date and Type of Prior Contract	Contract or Hospital Data

D. REFERENCES

Ref. 1: American Hospital Association Guide to the Health Care Field, 1975 Edition.

Ref. 2: Federal Information Processing Standard 8-4, Specifications for Standard Metropolitan Statistical Areas, June 30, 1974.

Ref. 3: U.S. Department of Health, Education, and Welfare; Social Security Administration; Hospital Costs Under the Health Insurance Program;" Schedule of Limits for Cost-Reporting Periods Beginning on or after July 1, 1975" (Federal Register, May 30, 1975, Volume 40, Number 105).

Ref. 4: U.S. Bureau of the Census, County and City Data Book, 1972, tables 2 and 3.

Ref. 5: U.S. Department of Health, Education, and Welfare, Hospitals: A County and Metropolitan Area Data Book, 1972, table 4.

Ref. 6: American Medical Association, Physician Distribution and Medical Licensure in the U.S., 1974, table 12.

Ref. 7: American Medical Association, Distribution of Physicians in the U.S. by Metropolitan Area, 1974, table 15.

DESCRIPTIVE ANALYSIS OF RADIOLOGY, PATHOLOGY, AND ANESTHESIOLOGY

D. ANALYSIS OF DESCRIPTIVE TABLES

Introduction

Our discussion of major findings is presented in two sections. In this section, we discuss the results of our descriptive analysis of quantitative data obtained on the hospital-based radiologists, pathologists and anesthesiologists in our sample of 120 hospitals. In Section E, we present the results of our analysis of approximately 185 contracts between the hospitals and their hospital-based physicians (HBPs). The analysis of the contractual arrangements in Section E should help the reader to interpret and place into perspective the quantitative data presented in this section. For example, comparisons of earnings figures for HBPs on different types of contractual arrangements do not necessarily indicate the actual difference in net incomes, because the expenses which the HBP must pay out of these earnings may vary quite considerably depending on the contractual arrangement. Thus, in combination, Sections D and E should provide a balanced overview of the major findings of this segment.

The questions discussed in this section are the following:

- How much do the HBPs earn on a full-time equivalent (FTE) basis in the three main specialties under study--radiology, pathology and anesthesiology?

- Are the HBPs' earnings related to the <u>type</u> of compensation arrangement under which they work? As we discuss

further below, our major focus will be on the differences between those HBPs who operate under a salary arrangement versus those whose compensation is based in some way on a percentage of the revenues of their department.

. Are HBP earnings and types of compensation arrangements related to certain hospital and area characteristics? Specifically:

  - hospital teaching status and complexity of services
  - hospital bed size
  - hospital not-for-profit or for-profit status
  - region of the country in which the hospital is located
  - whether or not the hospital is located in a Standard Metropolitan Statistical Area (SMSA)
  - the proportion of hospital revenues obtained from third party cost reimbursers
  - the portion of hospital revenues obtained under some form of prospective rate setting program

. Are HBP earnings and types of compensation arrangements related to the gross and net revenues of the HBPs' departments?

. Additional items. In addition to the preceding major topics, we also report in this section on our findings regarding the relationship between HBP earnings and type of compensation arrangement and the following variables:

  - whether the physician is a department head or not
  - who has the approval authority over the contractual arrangement and the fee schedule
  - the percentage of time devoted to patient care as reported by the HBP
  - other area characteristics, including per capita income, county occupancy rates, the ratio of physicians to population, and the relation of physicians to hospital beds

Qualifications

Our findings for each of the areas listed above are presented in the following sections. However, there are three important qualifications concerning the data which should be clearly understood in order to put the results in proper perspective.

The first important qualification deals with the fact that a significant number of the HBPs in the sample devote only part of their time to the hospitals from which data was obtained. Comparison of HBP compensation amounts would have been significantly distorted if we had used the raw (absolute) compensation figures in the data base, because of the mixture of part-time and full-time HBPs. In order to put all compensation data on a consistent basis, they have been converted to a full-time equivalent (FTE) basis. For example, if a HBP received annual compensation of $40,000 from a hospital, but only worked half-time for the hospital, this would be reflected in the descriptive analysis tables as FTE earnings of $80,000.[1]

Some adjustment of this type is necessary to present earnings data on all of the HBPs in the sample in a meaningful

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[1]An indication of the degree of adjustment involved is provided by the number of FTE physicians represented by our sample. The 500 radiologists in the sample represent 354 FTEs; hence, the "average" HBP radiologist devoted 71 percent of full-time to his work for the hospital from which we have data. Similarly, the 425 pathologists in the sample represented 283 FTEs, an average of 67 percent per physicians. Finally, the 291 anesthesiologists in the sample represent 224 FTEs, an average of 77 percent. Thus, for these three specialties, the average commitment to the hospital for which we have data is between 2/3 and 4/5 of full-time.

way. Before presenting the results, however, we should briefly explain the rationale behind such a conversion and the implications for the FTE compensation amounts.

First, the only compensation data we obtained was that paid to the HBP(s) by a particular hospital. Other possible sources of income, such as other hospitals, private practice, professorships, publications and consulting fees were beyond the scope of this study. Our conversion to FTE compensation partially adjusts for this lack of data.

Our adjustment to FTE compensation assumes that all HBPs in the sample work full-time, either in the sample hospital or elsewhere, and that the rate of compensation is the same elsewhere as in the hospital. In the example of earnings conversion cited immediately above, there is an implicit assumption that the HBP works elsewhere for half-time at the rate of $80,000 per FTE.

The results of this process may overstate or understate actual annual earnings depending on existing circumstances. If the HBPs tend to work more than what is considered full-time, the FTE earnings reported later in this chapter are lower than actual. The opposite is true if they tend to work less than full-time. By the same reasoning, the FTE earnings reported will be too high if the rate of compensation for work done elsewhere is less than it was in the hospital surveyed, and too low if the rate paid by the hospital is less than the rate received elsewhere.

Our working definition of a FTE HBP was 2,080 hours per year. We found, however, that there was almost no reliable data in the hospitals regarding the hours the HBPs actually worked in the hospital setting. Some hospitals specified the hours of medical coverage; others required the HBPs to be available as needed. Our survey teams carefully interviewed an appropriate administrative manager in an effort to obtain the most accurate assessment of the amount of time devoted to the hospital by the HBPs. The result of this was a necessary reliance on the judgments of a hospital administrative manager regarding the amount of time devoted to the hospital by the HBPs.

Our major concern regarding the proper interpretation of the data presented below is in the definition of FTE HBPs in teaching hospitals. Most of these HBPs were considered full-time but we were made aware of situations where significant additional consulting income was earned but not recorded in our data base. The reader should keep this in mind when making teaching vs. non-teaching income comparisons.

The second important qualification is that our descriptive analysis excludes all HBPs who bill patients directly. By "bill patients directly" we refer to a situation in which an HBP bills and collects any significant portion of his charges himself, rather than through the hospital's accounting system. In this situation, the sample hospital was unable to provide complete data on the HBP's compensation. Because the compensation data for such cases were incomplete, they were eliminated from the descriptive analysis.

Although we cannot present meaningful compensation data for HBPs who bill direct, we can provide an indication of the prevalence of direct billing for the time period covered by the study--fiscal year 1975. These data are presented in Table D-1 and discussed in the next section. However, it is important to keep in mind the qualification that the compensation data presented in the remainder of this section are based entirely on HBPs who do not bill their patients directly.

The third important qualification concerns the comparability of reported earnings for HBPs on salary versus those on percentage arrangements. (Refer to pages II-29, II-68 and II-69 for explanations of what "percentage arrangements" are.) Salaried HBPs typically receive a complete package of fringe benefits (including malpractice insurance premiums), the value of which is not included in our compensation data. HBPs on percentage arrangements, on the other hand, usually have to pay for their own fringe benefits, malpractice insurance and coverage during absence (vacations, conventions, etc.) out of the gross compensation reported in this study. There are also a few cases in which HBPs on a percentage arrangement must pay, out of the gross compensation reported herein, for certain of the expenses of operating their departments. (Refer to page II-71 for a list of some of these expenses.) These expenses are almost always borne by the hospital for departments staffed by salaried HBPs.

Thus, the reported compensation data represent "net" income to the salaried HBP. To the HBP on a percentage arrangement,

the reported compensation data represent "gross" income, out of which the HBP has to pay certain expenses.

While this does introduce some inconsistency into the data, the situation was recognized at an early stage and was investigated further in Phase II. The multivariate analysis presented in Segment IV and the case studies in Segment V both shed light on this issue. The results in both segments seem to indicate that even after controlling for a considerable number of factors, the additional costs borne by HBPs on percentage arrangements are not large enough to account for the significantly higher average FTE earnings of these HBPs versus those on salary.

Summary of the Departments and HBPs in the Sample

In order to provide additional perspective to the study, this section presents certain summary statistics relating to:

- the number of HBPs and FTE HBPs, by specialty, included in the study sample;
- the significance of total revenues and costs in the departments under study relative to total revenues and costs in the sample hospitals; and
- the significance of total HBP compensation costs in the departments under study relative to total costs in these departments.

Table D-1 summarizes the sample composition in terms of the number of HBPs and the number of FTE HBPs by specialty[1]. The table indicates that over 2,600 HBPs were included in the study and

[1] In order to account for the entire sample, this section (including Tables D-1 and D-2) discusses all five of the major HBP specialties. With the exception of this one section, all other material dealing with the descriptive analysis of two of these specialties--cardiologists and emergency room physicians--is presented in Segment III.

TABLE D-1

HBPs AND FTEs BY SPECIALTY

Specialty	Total HBPs	Total FTE HBPs	HBPs Billing Direct		HBPs Not Billing Direct	
			Number	Percent	Number	Percent
Radiologists	500	354	142	28%	358	72%
Pathologists	425	283	58	14	367	86
Anesthesiologists	291	225	186	64	105	36
Cardiologists	612	112	33	5	579	95
Emergency Room Physicians	418	216	68	16	350	84
Subtotal	2,246	1,190	487	22%	1,759	78%
Other Specialists	382					
Total	2,628					

The accompanying text is an integral part of this table.

that almost 2,250 of these HBPs were in one of the five specialties which are analyzed in detail.

Also indicated by Table D-1 is that the sample includes almost 1,200 FTEs in the five major HBP specialties. Overall, this indicates that the HBPs in these five specialties devote slightly over 50 percent of their time to the hospitals in the study. However, it should be noted that this percentage varies from 18 percent for the cardiologists to 77 percent for the anesthesiologists. This low percentage of the cardiologists results primarily from the fact that many of the small and medium-sized hospitals in the sample used large cardiology group practices to meet, on a part-time basis, relatively small requirements (often less than one FTE) for cardiology services. This would seem to indicate that cardiologists tend to form large group practices and tend to serve several different hospitals or have a significant private practice.

Table D-1 also presents data on the number of HBPs who engage to some extent in direct billing. The data indicate that, except for anesthesiology, the elimination of HBPs who bill direct does not have a severe impact on sample sizes. The percentage of HBPs lost to direct billing ranges from 5 percent of the cardiologists to 28 percent of the radiologists. The number of HBPs remaining in the sample after the direct billing eliminations range from 350 emergency room physicians to 579 cardiologists.

For the anesthesiologists, the elimination of HBPs who bill direct does have a significant impact on sample size. Of the 291 anesthesiologists in the original sample, 186 (64 percent)

are involved with direct billing to some extent; leaving only 105 anesthesiologists in the sample subject to detailed descriptive analysis. As a result of this small sample size, the findings for anesthesiologists presented in the remainder of this segment are subject to consistent qualification, and anesthesiologists are omitted entirely from the multivariate analysis presented in Segment IV.

Table D-2 presents data which quantify the significance of the departments under study in relation to the hospitals in which they operate. The first column of data contains departmental revenue as a percentage of hospital revenue, based on gross patient revenue (charges). The table indicates that the five departments covered by the study account for a combined total of over 28 percent of total hospital revenues. The departmental percentages range from less than 2 percent for cardiology to over 7 percent for radiology and almost 11 percent for pathology.

The second column of data presents departmental cost (total fully-allocated cost after stepdown) as a percentage of hospital cost (total operating cost). The table indicates that the five major HBP departments account for a combined total of almost 22 percent of total hospital costs. The departmental percentages range from less than 1 percent for cardiology to over 8 percent for pathology.

The data in these first two columns present an interesting comparison. Although these departments represent less than 22 percent of fully-allocated hospital cost, they generate over 28 percent of hospital revenues. This indicates the extent to

TABLE D-2

SIGNIFICANCE OF DEPARTMENTAL REVENUES, COSTS, AND HBP COMPENSATION

Department	Departmental Revenue as a Percentage of Hospital Revenue	Departmental Cost as a Percentage of Hospital Cost	Total HBP Remuneration Cost as a Percentage of Total Direct Departmental Cost
Radiology	7.2%	5.2%	42.3%
Pathology	10.9	8.6	26.5
Anesthesiology	4.6	3.2	77.2
Cardiology	1.6	0.8	64.6
Emergency Room	4.3	4.0	48.6
Total	28.6%	21.8%	

The accompanying text is an integral part of this table.

which these departments are used by hospitals to subsidize other departments. This comparison, of course, is not nearly as simple as presented here, because a significant portion of actual hospital reimbursement is not based on charges (which are used here as the measure of revenue).

The last column presents total HBP remuneration in each department as a percentage of total direct departmental cost (before allocation or stepdown). The data indicate that the significance of total HBP remuneration within each department ranges from less than 27 percent in pathology to over 77 percent in anesthesiology.

With this background information on the sample composition and the significance of the major HBP departments having been discussed, the next section begins the presentation of the findings related to HBP earnings, contractual arrangements and other variables.

HBP Earnings

Our information on HBP earnings is derived from a sample of 358 radiologists, 367 pathologists and 105 anesthesiologists. Bearing in mind the qualifications made in the introduction to this section, the basic earnings data for these three specialties are presented in Table D-3. The table shows that radiologists and pathologists both have average FTE earnings of around $100,000, while anesthesiologists have a lower average of around $80,000. However, the fairly large standard deviations, especially for radiologists and pathologists, suggest that quite a few of the

TABLE D-3

FTE COMPENSATION AMOUNTS BY SPECIALTY

Specialty	Sample Size[a]	Average FTE Earnings[b]	Standard Deviation[b]	Percentage of HBPs with FTE Earnings in the Following Categories[c]			
				Less than $75,000	$75,000-$150,000	$150,000-or More	$200,000 or More
Radiologists	358	$103,200	$61,500	35%	50%	15%	4%
Pathologists	367	98,400	67,800	45	40	15	10
Anesthesiologists	105	80,000	33,300	41	57	2	2

[a] Excluding those HBPs who bill patients directly.
[b] Rounded to the nearest $100.
[c] The percentages in the first three columns will add to 100%, except for discrepancies due to rounding.

The accompanying text is an integral part of this table.

HBPs earn considerably more or considerably less than the average. This can be seen more clearly by the percentage distribution figures presented in Table D-3, which show the proportion of the HBPs in various FTE earnings categories.

The percentage distributions show that although the "average pathologist or radiologist" earns around $100,000, 35 percent of the radiologists and 45 percent of the pathologists earn less than $75,000. At the upper end of the earnings range, 15 percent of both the radiologists and the pathologists, or about one out of every six or seven, earn $150,000 or more. For radiologists, most of these HBPs are in the $150,000-$200,000 range, since only 4 percent of all radiologists earn $200,000 or more. A higher proportion, 10 percent, of the pathologists, are in the $200,000 and above category.

The earnings pattern for anesthesiologists is considerably lower than that for radiologists and pathologists. The average FTE earnings for anesthesiologists are $80,000, considerably below the average earnings for both radiologists and pathologists. This is also reflected in the distribution of anesthesiologists by earnings category. Only 2 percent of the anesthesiologists earn over $150,000, and these are actually in the over $200,000 category. However, when comparing anesthesiologists to the other two specialties, it is important to keep in mind that in our sample, the anesthesiologists had by far the greatest prevalence of direct billing. Those who bill patients directly may have significantly higher or lower earnings; the data do not permit complete analysis of this issue.

In summary, although these earnings data give some indication of the average FTE earnings and the distribution of earnings for these three HBP specialties, the wide dispersion in the earnings within each specialty suggests that we cannot draw firm conclusions regarding HBP earnings without examining other factors which might affect those earnings. As we discuss below, two factors we found to have a major bearing on the amount of earnings were the type of compensation arrangement under which the HBP operates and whether or not the hospital in which the HBP operates is a teaching institution.

FTE Earnings and Type of Compensation Arrangement

In the detailed descriptive tables generated for this study, a number of different compensation arrangements is included. Specifically, the detailed tables present data for the following categories of compensation arrangement:

1. Salary
2. Fee-for-Service
3. Percent of Net
4. Percent of Gross
5. Combination
6. Other

Nearly three-quarters of the HBPs for which we have earnings information operate under either a salary or a percentage arrangement. The rest are compensated either by fee-for-service, some combination arrangement (usually involving a salary and some form of percentage), or compensation based on relative value units. Among these, compensation based on some form of fee-for-service (in which we would include the relative value unit arrangement) is probably the most important for policy analysis. However, because we have earnings information only for those who bill

through the hospital on a fee-for-service basis (i.e., we have no information on those who bill patients directly), our data for fee-for-service providers are based on a small and not necessarily unbiased sample.

In this report, we will concentrate on the salary and percentage compensation arrangements. In this latter category we include the categories in the detailed tables labeled as percentage of gross and percentage of net. Technically, the percentage of gross arrangement is one in which the HBP obtains some percentage of the gross billed charges of the department in which he works. No deductions are made from the billed charges in determining his compensation. The percentage of net arrangement is then one in which some deductions are made in departmental billed charges, and then the HBP obtains a percentage of the remainder. These deductions commonly include bad debts, contractual adjustments, charity care, hospital employee services and professional courtesies. More details on the nature of these deductions are presented on pages II-68 and II-69.

We have chosen to combine the gross and net percentage categories into one for purposes of this presentation for two reasons: First, both percentage arrangements should create similar incentives for HBP behavior, since in each case the HBP's compensation depends heavily on the total amount of billed charges. Second, in many instances (as is indicated in our contract analysis), the distinction between percentage of net and percentage of gross is often unclear and has to be made arbitrarily. For these two

reasons, then, we pool the data from the percentage of net and percentage of gross categories in this discussion.

Of the radiologists, 22 percent are on a salary basis and 51 percent on a percentage basis. Similar figures apply to the pathologists, with 31 percent on salary and 43 percent on percentage. For the anesthesiologists, the percentages are reversed, with over half, 54 percent, on salary and only 18 percent on a percentage arrangement. (Again, we should remember that these data exclude those HBPs who bill their patients directly and that nearly two-thirds of the anesthesiologists in our sample utilized direct billing.) In conjunction with the average FTE earnings in Table D-3, these figures on salary versus percentage methods by specialty suggest that higher earnings are associated with being under some form of percentage arrangement and lower earnings are associated with being compensated on the basis of a salary.

This relationship is further supported by examining the average FTE earnings for those on salary versus those under a percentage arrangement. This is done in Table D-4.

Table D-4 shows the marked difference in average FTE earnings by type of compensation arrangement. Those on a percentage arrangement earn considerably more than those on a salary arrangement, especially for the pathologists and radiologists. The data on standard deviation and the distribution by earnings categories reinforce these differences. For example, 95 percent of the radiologists on salary earn less than $75,000 and none earns over $150,000, while only 11 percent of the radiologists under a

TABLE D-4

COMPENSATION ARRANGEMENT BY SPECIALTY[a]

Specialty and Compensation Arrangement	Sample Size[g]	Average FTE Earnings	Standard Deviation	Percentage of HBPs with FTE Earnings in the Following Categories[f]		
				Less than $75,000	$75,000-$150,000	$150,000 or More
Radiologist - Salary	78	$ 52,600	$12,100	95%	5%	0%
Radiologist - Percentage	181	124,400	b, c	11	63	26
Pathologist - Salary	114	49,200	16,100	90	10	0
Pathologist - Percentage	156	138,200	b, d	17	52	31
Anesthesiologist - Salary	57	62,300	23,400	67	33	0
Anesthesiologist - Percentage	19	87,400	b, e	20	80	0

[a] Excluding those HBPs who bill patients directly.

[b] The standard deviation was computed separately for the percentage of net and percentage of gross arrangements and has not been combined mathematically. The separate results were:

	Sample Size	Average FTE Earnings	Standard Deviation
[c] Radiology - Percent of Net	104	$127,400	$57,100
Radiology - Percent of Gross	77	120,500	47,700
[d] Pathology - Percent of Net	106	156,700	79,200
Pathology - Percent of Gross	50	99,100	47,800
[e] Anesthesiology - Percent of Net	9	85,200	26,900
Anesthesiology - Percent of Gross	10	89,500	9,200

[f] The percentages in these columns will add to 100%, except for discrepancies due to rounding.

[g] These sample sizes represent the number of HBPs in these three specialties that had either a pure salary or pure percentage arrangement. All arrangements that involved a combination of salary and percentage, and all other arrangements were eliminated from this analysis.

The accompanying text is an integral part of this table.

percentage arrangement earn less than $75,000 and 26 percent earn more than $150,000. This sharp contrast is also apparent for pathologists, and is similar but not as significant for the anesthesiologists.

Thus, our findings suggest that HBPs under percentage compensation arrangements earn considerably more than those who are paid a salary. However, it is important to keep in mind when making such comparisons that the HBP on a percentage arrangement often must cover costs out of his compensation which the HBP on salary does not. As indicated in our subsequent discussion of the HBP contracts, the costs typically include payment for coverage during absence (e.g., vacations, conventions, etc.), malpractice insurance, other fringe benefits, and occasionally payment of the salaries of other highly trained personnel (but excluding nurses and technicians who are usually paid by the hospital).

The relationship of both earnings and type of arrangement to other variables will now be examined.

Hospital Teaching Status and Complexity of Services as Related to FTE Earnings and Type of Compensation Arrangement

As we noted earlier, one of our major efforts was to relate the amount and type of HBP compensation to various hospital and area characteristics, such as teaching status, bed size, region and so forth. The variable we found most closely associated with HBP earnings and with type of compensation arrangement was the hospital's teaching status.

We defined a hospital to be a teaching hospital if it met any of the following conditions:

1. Residency or internship approved by AMA (November, 1974) or by American Osteopathic Association (January, 1975).

2. Medical school affiliation, reported by AMA (November, 1974).

3. Member of Council of Teaching Hospitals of the Association of American Medical Colleges (January, 1975).

Since teaching institutions tend to pay physicians on a salary basis, and since the results presented above indicate that HBPs on salary tend to earn less than those under a percentage arrangement, we expect that HBPs in teaching institutions will have lower earnings and be more likely to be on a salary arrangement than HBPs in nonteaching hospitals. Our findings support this expectation for radiologists and pathologists[1], but are somewhat ambiguous with regard to anesthesiologists. This can be seen in Table D-5.

As Table D-5 indicates, the earnings of HBPs in nonteaching institutions are considerably greater than those in the teaching institutions, at least for the radiologists and pathologists. In fact, the average FTE earnings of pathologists in nonteaching hospitals are nearly double the average FTE earnings of pathologists in teaching institutions. These large differences in average FTE earnings are supported by the differences in the

[1]We should point out, however, that several hospitals acknowledged pecuniary benefits in addition to salaries. To the extent that this is prevalent, the earnings differences will be mitigated.

TABLE D-5

FTE COMPENSATION AMOUNT AND TYPE BY HOSPITAL TEACHING STATUS

Specialty and Hospital Teaching Status	Sample Size	Average FTE Earnings	Percentage of HBPs with FTE Earnings in[a]			Percentage of HBPs with Compensation Arrangement[b]	
			Less than $75,000	$75,000-$150,000	$150,000 or More	Salary	Percentage
Radiologists - Teaching	192	$ 89,500	49%	45%	6%	41%	35%
Radiologists - Nonteaching	166	118,900	21	55	24	0	69
Pathologists - Teaching	194	67,200	65	31	4	53	20
Pathologists - Nonteaching	173	133,300	22	49	29	6	68
Anesthesiologists - Teaching	55	79,500	37	64	0	47	20
Anesthesiologists - Nonteaching	50	80,500	46	50	4	62	16

[a]Percentages will add to 100% except for rounding.
[b]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

distribution of HBPs by earnings categories. For both radiologists and pathologists, a much larger share of HBPs in nonteaching institutions are in the higher earnings categories than is the case for the HBPs in the teaching institutions.

For radiologists and pathologists, the type of compensation arrangement is also markedly different between teaching and nonteaching hospitals. HBPs in teaching institutions are much more likely to be compensated on the basis of salary than are those in nonteaching institutions, as is indicated by the last two columns of Table D-5. In nonteaching hospitals, the percentage arrangements are much more common, with nearly 70 percent of both the radiologists and the pathologists in our sample being compensated in this manner.

For anesthesiologists, no such strong patterns emerge. The average FTE earnings are virtually identical for those in teaching versus those in nonteaching hospitals, and the distribution of HBPs by earnings categories, as well as their distribution by type of compensation arrangement, do not differ markedly between the teaching and the nonteaching hospitals. Again, however, we must note the smaller samples we have for anesthesiologists, and the fact that so many more of the anesthesiologists in our sample utilize direct billing arrangements. We also found that a higher proportion of anesthesiologists in teaching hospitals utilize direct billing than did those in nonteaching hospitals. (The percentages are 69 percent of anesthesiologists in teaching hospitals and 57 percent of those in nonteaching hospitals utilize direct billing.)

We also attempted to relate a measure of the complexity of services offered by the hospital to the HBP earnings and type of compensation arrangement. We did not develop a highly sophisticated measure of complexity, but rather used as indicators whether or not the hospital had (1) an intensive care unit and (2) cobalt therapy, radium therapy or therapeutic radioisotope facilities.

Contrary to our original expectations, the more complex the institution, the lower the earnings and the greater the proportion of HBPs under a salary arrangement. We believe this is primarily a reflection of the fact that the more complex institutions will generally be more likely to be teaching institutions. Hence, we believe that teaching status is a far better predictor or indicator of earnings and type of arrangement than is our measure of complexity of service, and teaching status serves as a useful proxy measure for complexity of service.

Hospital Bed Size and Its Relationship to FTE Earnings and Type of Compensation Agreement

For a number of reasons, HBPs in the smaller hospitals might be expected to earn more than those in larger hospitals. Many of the small hospitals are located in more remote areas. Since they must have the HBPs in order to be accredited, small

hospitals might be willing to pay a premium to get them.[1] The large hospitals, on the other hand, are often located in more desirable urban settings and are more likely to be prestigious institutions. Hence, physicians are more likely to be willing to work in the larger institutions and to do so for lower earnings. Also, because of these factors and because teaching hospitals are more likely to engage in salary arrangements with physicians, we expected that HBPs in the larger hospitals would more likely be on salary arrangements than would HBPs in the smaller hospitals.

For our analysis, we utilized three hospital size measures using the number of general service beds: small hospitals of less than 100 beds, medium sized hospitals of 100-299 beds, and large hospitals with 300 or more beds. Our findings, summarized in Table D-6, are generally consistent with the expectations just presented. Again, however, the results for anesthesiologists are ambiguous.

Table D-6 shows the considerably higher earnings and the much greater prevalence of percentage types of compensation

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[1]One possible theory is that small hospitals find it necessary to pay for HBP availability. That is, that HBPs spend a smaller percentage of their time at a small hospital, and their absolute compensation from the hospital is reduced, but not in full proportion to their reduced input. The table below summarizes this theory for radiologists:

Hospital Size	No. of HBPs	No. of FTEs	Full-Time %	Average Compensation	
				Absolute	Per FTE
Small	63	17	27	$33,800	$125,300
Medium	192	129	67	74,800	111,300
Large	245	208	85	76,600	91,200

TABLE D-6

FTE COMPENSATION AMOUNT AND TYPE BY HOSPITAL BED SIZE

Specialty and Hospital Size		Sample Size	Average FTE Earnings	Percent of HBPs on[a] Salary	Percentage
Radiologists	- less than 100 beds	39	$125,300	0%	97%
Radiologists	- 100-299 beds	146	111,300	6	60
Radiologists	- 300 and more beds	173	91,200	40	32
Pathologists	- less than 100 beds	28	107,500	7	43
Pathologists	- 100-299 beds	137	143,300	10	71
Pathologists	- 300 and more beds	202	66,600	49	23
Anesthesiologists	- less than 100 beds	13	57,200	85	8
Anesthesiologists	- 100-299 beds	28	87,900	57	0
Anesthesiologists	- 300 and more beds	64	81,200	47	28

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

arrangements for both radiologists and pathologists in the small and medium sized hospitals as compared to the large hospitals. The salary arrangement is quite rare in hospitals of less than 300 beds.

For the anesthesiologists, those in the medium and large hospitals have higher average FTE earnings than those in small hospitals, and the prevalence of salary arrangements is greater in the smaller than the larger hospitals. The results for anesthesiologists are plagued, however, by the quite small sample sizes for the medium and small hospitals and by the fact, as mentioned numerous times already, that direct billing is much more prevalent for the anesthesiologists in our sample than it is for the other two specialties.

Thus, in general, at least for the radiologists and pathologists, our findings agree with the hypothesis that earnings tend to be greater and the type of arrangement is more likely to be a percentage arrangement in the smaller than in the larger hospitals. (We also noted that the prevalence of direct billing appeared to be greater in the small than in the medium and large hospitals for radiologists and pathologists; however, the impact of this cannot be determined from the data available.)

For-Profit or Not-for-Profit Status and Relationship to FTE Earnings and Type of Compensation Arrangement

We examined the for-profit/not-for-profit issue in order to see if the for-profit hospitals might more successfully "hold the line" on the costs of HBP services. Our presumption

was that the profit potential of the HBP departments would be attractive sources of additional profits in for-profit institutions, and that such institutions would thereby have strong incentives to attempt to keep the amounts paid to the HBPs themselves as low as possible. Hence, we expected lower compensation amounts and perhaps a greater prevalence of salary arrangements in the for-profit institutions than the not-for-profit institutions. However, we expected this to be partially offset by the fact that teaching institutions are much more likely to be found in the not-for-profit category than in the for-profit category.

Unfortunately, we cannot say a great deal about the differences between for-profit and not-for-profit hospitals in terms of our data. In our sample, the number of HBPs in for-profit hospitals and for whom we have data is quite small. We have only 24 such radiologists, 10 pathologists, and no anesthesiologists. In the for-profit hospitals, the most prevalent compensation arrangement is the percentage arrangement. None of the radiologists in the for-profit hospitals is on salary and only 2 of the 10 pathologists are. With regard to earnings, we found virtually no difference in average FTE earnings between the radiologists in not-for-profit institutions and those in for-profit institutions. The pathologists in the for-profit hospitals earn an average of $123,000, versus the $98,000 average in the not-for-profit hospitals; however, once again, the number of pathologists in for-profit hospitals on which this average is calculated is only 10. Hence, the smallness of our sample for

the for-profit hospitals does not allow us to analyze in any detail the effect that for-profit status might have on HBP earnings and type of arrangement.

Regional Differences in the Amount and Type of Compensation

Our sample of HBPs was drawn from across the country. Since practice patterns, price levels and compensation arrangements could vary considerably among regions of the country, we examined HBP earnings and compensation arrangement data for the four major regions of the country. Our findings are summarized in Table D-7.

For all three specialties, the highest average FTE earnings occur in the West. For pathologists and radiologists, the lowest average FTE earnings occur in the Northeast region. This region is the third lowest for anesthesiologists in average FTE earnings, with the South being the lowest average FTE earnings region for anesthesiologists.

These regional differences in average FTE earnings seem consistent with regional differences in type of compensation arrangement. For the radiologists and pathologists, the percentage arrangements are much more prevalent in the West than in the other regions. Salary arrangements are at least as prevalent or more prevalent in the Northeast region than in the other regions for these two specialties. For anesthesiologists, the results for type of compensation arrangement are again unique, with the percentage arrangement occurring only in the Northeast. Again,

TABLE D-7

REGIONAL DIFFERENCES IN FTE COMPENSATION AMOUNT, COMPENSATION TYPE, AND TEACHING STATUS

A. AMOUNT OF FTE COMPENSATION

Specialty	West		North Central		South		Northeast	
	Sample Size	Average FTE Earnings	Sample Size	Average FTE Earnings	Sample Size	Average FTE Earnings	Sample Size	Average FTE Earnings
Radiologist	109	$129,400	87	$110,000	66	$87,700	96	$77,800
Pathologist	101	141,600	93	82,000	99	90,000	74	71,300
Anesthesiologist	3	167,700	28	86,200	46	71,900	28	77,600

B. TYPE OF COMPENSATION[a]

Specialty	Salary	Percentage	Salary	Percentage	Salary	Percentage	Salary	Percentage
Radiologist	0%	90%	42%	51%	29%	49%	41%	39%
Pathologist	7	91	60	27	39	54	55	28
Anesthesiologist	0	0	38	0	86	0	32	68

C. PERCENT OF HBPs IN TEACHING HOSPITALS

Specialty				
Radiologist	20%	49%	62%	69%
Pathologist	20	43	57	74
Anesthesiologist	58	56	68	54

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

the small sample sizes for the anesthesiologists preclude us from drawing any definitive conclusions for the anesthesiologists.

We suspect that these differences in amount and type of compensation by region are very closely related to regional differences in our sample in the proportion of HBPs in teaching hospitals. The relevant data are shown at the bottom of Table D-7. Again, the data for radiologists and pathologists appear more reliable than the data for the anesthesiologists. For these two specialties, the West has by far the lowest proportion of its HBPs in teaching hospitals, and this region also has the highest average FTE earnings and the greatest proportion of HBPs working under percentage arrangements. The results for the Northeast region are consistent with this pattern. It has the highest proportion of HBPs in teaching hospitals, and the lowest average FTE earnings which reflects the relatively high proportion of HBPs working on a salary arrangement of all four regions.

Hence, the regional differences in our sample appear to be closely related to differences in the teaching status of HBPs among regions. Teaching status appears to be a much more important factor in our sample than are other possible reasons for differences among regions, such as practice patterns and price level differences.

Standard Metropolitan Statistical Area (SMSA) Location and Compensation Amount and Type

In our research design, we hypothesized that urban/rural differences could affect the amount and type of compensation of

HBPs. We anticipated that hospitals in nonurban areas would have to pay a premium to obtain these specialists. At the same time, the prestigious teaching institutions are generally located in urban settings. For both reasons, we expected earnings to be higher in the non-SMSAs than in the SMSAs. By the same token, we expected a greater prevalence of salary compensation arrangements in the SMSA than in the non-SMSA areas, and, likewise, a greater prevalence of the percentage arrangements in the non-SMSAs.

Our findings are generally consistent with these hypotheses, at least for the pathologists and radiologists. Our results are summarized in Table D-8.

For the pathologists and the radiologists, average FTE earnings in the non-SMSAs are substantially greater than the average FTE earnings in the SMSAs. However, the statistical significance of the difference in average FTE earnings is questionable given the very small sample size in the non-SMSA areas. For the anesthesiologists, average FTE earnings are actually higher in the SMSAs; however, we have only two anesthesiologists in our sample who are not in SMSAs.

The results for the type of compensation arrangement are also as we expected. In fact, none of the HBPs located in

TABLE D-8

SMSA LOCATION RELATED TO AMOUNT AND TYPE OF HBP COMPENSATION

Specialty and SMSA Location	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Radiologist - SMSA	331	$100,900	24%	47%
Radiologist - non-SMSA	27	130,500	0	96
Pathologist - SMSA	344	96,500	33	39
Pathologist - non-SMSA	23	126,700	0	91
Anesthesiologist - SMSA	103	80,600	55	17
Anesthesiologist - non-SMSA	2	49,500	0	50

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

non-SMSAs was paid on a salary basis. All of those paid on a salary in our sample are located in the SMSAs.[1]

Therefore, although our sample size for those in non-SMSAs is quite small, our findings are consistent with the expectation that average FTE compensation would be greater and the prevalence of percentage type of compensation arrangements would also be greater in the non-SMSA than in the SMSA areas.

The Effect of Cost Reimbursement

We also examined the question of whether or not the amount of FTE compensation received by the HBPs increased as the percentage of hospital revenues reimbursed by cost-based third parties (including Medicare, always, plus Blue Cross and/or Medicaid when they reimburse retrospectively) increased. This might be expected to happen if the hospital had less incentive to be concerned with the compensation of the HBP as the effect of such compensation on its own net revenues diminished.

To examine this question, we related the percentage of hospital revenues obtained from third-party cost reimbursers to the average FTE earnings of the HBPs. The results are summarized in Table D-9. Our findings for the average FTE earnings are consistent with the hypothesis. For radiologists and pathologists,

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[1]The prevalence of direct billing of patients was much higher in the non-SMSAs than in the SMSAs. To illustrate, for the non-SMSAs, the proportions of HBPs billing direct varied from 47 percent for radiologists to 88 percent for anesthesiologists, with pathologists at 54 percent. In contrast, for those HBPs in SMSAs, the percentage billing direct varied from a low of 8 percent for pathologists to a high of 63 percent for anesthesiologists, with radiologists at 26 percent. Therefore, the difference in average FTE earnings between SMSAs and non-SMSAs could be larger or smaller than revealed by our data.

TABLE D-9

COST REIMBURSEMENT AND AMOUNT AND TYPE OF HBP COMPENSATION

Specialty and Percent of Total Hospital Revenues from Cost Reimbursers	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Radiologist - under 50%	110	$ 80,600	37%	35%
Radiologist - over 50%	248	113,100	15	57
Pathologist - under 50%	114	86,400	46	29
Pathologist - over 50%	253	103,800	25	49
Anesthesiologist - under 50%	38	76,400	61	39
Anesthesiologist - over 50%	67	82,000	51	6

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

the difference in average FTE earnings is substantial, with HBPs in hospitals which obtain more than half their total revenues from cost reimbursers obtaining higher average FTE earnings than HBPs in hospitals with less than half their revenues from cost reimbursers. For anesthesiologists, the difference in average FTE earnings is in the same direction but is not pronounced.

Differences in the types of compensation arrangements are also consistent with this pattern. Salary arrangements are more prevalent in hospitals which obtain less than half their revenues from cost reimbursers, while the percentage type arrangements are more prevalent, with the exception of the anesthesiologists, in hospitals receiving more than half their revenues from cost reimbursers.

These findings are therefore consistent with the hypothesis that as the share of hospital revenues from cost reimbursers increases, HBPs tend to operate on a percentage type of contractual arrangement, leading to higher average FTE earnings than is the case in hospitals with lower shares of reimbursement from cost reimbursers.

The Effect of Prospective Rate Setting Programs

We also sought to obtain some preliminary data which would indicate whether or not prospective rate setting programs appear to be related to lower average FTE earnings for HBPs. To do this, we related the percentage of hospital revenues obtained under a prospective rate setting program to the earnings and type

of compensation arrangement of the HBPs. Because for the time period covered in this study (fiscal year 1975) no hospitals in our study were totally under a prospective rate setting program, hospitals in our sample had shares of their revenues under prospective reimbursement ranging from 10 percent to over 50 percent.

We found that average FTE earnings were higher for those HBPs who were not under prospective rate setting programs. For example, for pathologists, the 301 HBPs not in a prospective rate setting program had average FTE earnings of $105,600, while the 66 HBPs under some form of a rate setting program had average FTE earnings of only $65,500. For radiologists, the average FTE earnings figures were $112,300 in the nonprospective rate setting areas and $70,800 in the prospective rate setting hospitals. (For anesthesiologists, only 11 HBPs were in prospective rate setting programs, and in these, less than 25 percent of the hospital's revenues came from the rate setting program.)

Thus, the data are at least consistent with the theory that prospective rate setting has some downward impact on HBP earnings. However, other factors are involved which may have a greater impact than the prospective rate setting program. For instance, all of the prospective rate setting states in our sample are located in the Northeast region. Because of the high prevalence of teaching institutions in our sample for that region, the average FTE earnings in the Northeast are, in general, lower than in the other regions for our sample. For example, the

average FTE earnings of all radiologists is $103,200, while in the Northeast it is only $77,800. Thus, from these preliminary data, we cannot conclude that prospective rate setting has a constraining effect on the earnings of HBPs. Nevertheless, earnings are lower in prospective rate setting hospitals, and this issue therefore merits further examination.[1]

Departmental Revenues and FTE Earnings and Type of Compensation Arrangement

One of the important questions for this study was the relationship between the earnings of HBPs and the revenues of the departments in which they operated. Our hypothesis was that average FTE earnings of HBPs would be greater as the gross and net revenues of the departments in which they worked increased. Such a result would be expected in part due to the greater responsibility and perhaps greater productivity of HBPs in the high revenue producing departments.

We found that both the departmental gross and departmental net revenues are very strongly correlated with the amount of earnings of the HBPs. We measured both the gross and the net revenues on a per FTE HBP basis. Thus, we generally found that

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[1]We also found very little direct billing in the hospitals in our sample which were under prospective rate setting. This was somewhat surprising, but may also be a reflection of the fact that most HBPs in such a setting are in the Northeast and are likely to be in teaching hospitals, where salary arrangements are common and direct billing is not--in the Northeast only 15 percent of the HBPs in our sample bill directly; in the other 3 regions, this percentage ranged from 27 to 49 percent.

as gross and net revenues per FTE HBP increase so do the average FTE earnings of the HBPs. The relationship between net revenues per FTE and the amount and type of HBP compensation appears to be the stronger of the two, and our summary findings are presented in Table D-10.

The table indicates that as the net revenues per FTE increase the average FTE earnings of HBPs also increase; this applies to all three specialties. There is also a general tendency for the proportion of HBPs on salary arrangements to decline as net revenues increase, and for the proportion on percentage arrangements to increase as net revenues per FTE increase. This result is most apparent for the radiologists. For the pathologists, the result for the percentage arrangements applies, but there is no strong decline in the proportion of HBPs on salary as the net revenues per FTE increase. And, for the anesthesiologists, if we exclude the five cases with net revenues of over $300,000 per FTE, then we see a decline in the proportion of HBPs on a salary arrangement, but no dramatic increase in the proportion on a percentage arrangement.

Therefore, we generally do find a strong direct association between the earnings of HBPs and the overall gross and net revenues of the departments in which they operate.[1]

[1]The net revenue measured here represents the gross revenues of the department minus all allocated costs except for any remuneration to the HBPs. This net revenue, we assume, is then divided up between the HBPs and the hospital. This procedure, of course, to some extent biases the relationship in favor of a positive correlation between net revenue per FTE and amount of HBP compensation, since the amount of HBP compensation is included in the net revenue figure. Data on the net revenue remaining after compensation of the HBPs, however, still indicate a positive association between net revenue and average FTE earnings. Thus, both the hospital and HBP gain as net revenue per FTE increases.

TABLE D-10

DEPARTMENT NET REVENUE PER FTE AND
AMOUNT AND TYPE OF HBP COMPENSATION

Specialty and Net Revenues per FTE[b]	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Radiologist - <$100K	34	$ 54,700	38%	35%
Radiologist - $100-300K	274	93,800	23	47
Radiologist - >$300K	50	187,500	6	78
Pathologist - <$100K	49	56,400	35	10
Pathologist - $100-300K	163	86,700	22	46
Pathologist - >$300K	155	123,900	39	49
Anesthesiologist - <$100K	33	64,000	76	18
Anesthesiologist - $100-300K	67	86,300	40	19
Anesthesiologist - >$300K	5	101,200	100	0

[a]Percentages will not add to 100% because not all compensation arrangements are included.

[b]"K" represents $1,000.

The accompanying text is an integral part of this table.

Additional Items

A number of the additional topics we examined deserve mention in this summary section. These include the relationship of the amount and type of HBP compensation to the following variables:

1. Department head or nonhead.
2. Who has approval authority for contracts and fee schedules.
3. The percent of HBP time devoted to patient care.
4. Area variables such as per capita income, county occupancy rate, physician to population ratios, and physician to hospital bed ratios.

Our findings in each of these areas will now be briefly discussed.

1. Department heads-

   We expected that department heads would obtain higher compensation amounts than would the nonheads. We were able to examine this only for those on individual contracts, since for those on group contracts we were generally unable to determine the compensation of each individual physician within the group. As a result, certain hypotheses involving department head data could not be addressed by the study.

   Our general finding was that the earnings did appear to be somewhat higher for the department heads than the nonheads, but the differences were not very great. For example, for radiologists, 38 percent of the department heads earned between $75,000 and $150,000 while 31 percent of the nonheads were in this earnings range. In the range of $150,000 and over, 21 percent of the heads and 18 percent of the nonheads were included. The differences were thus not great.

2. Contract and price approval-

   We anticipated that the more layers of approval required for a HBP to change the price of his service or to establish a contractual relationship, the less likely it would be to find excessive compensation amounts. On the other

hand, we expected that where the HBP had to obtain many levels of approval for his contract, we would be more likely to find a percentage arrangement that would be more vague about the exact amount of compensation.

No strong patterns emerged here in terms of earnings by who approves the contracts or fee schedules. However, in terms of the type of contractual arrangement, we did find that where Board approval was required, the greatest prevalence of percentage arrangements was found, and where the hospital administrator was the approving authority, we found the lowest prevalence of percentage arrangements. Also, we found the largest prevalence of salary arrangements where outside approval was required.

3. Percent of time devoted to patient care-

This variable is an estimate of the proportion of the HBP's hospital time which is devoted to patient care. The estimate is derived by the hospital and the HBP(s) and is subject to review by the Medicare intermediary. We initially hypothesized that as this percentage decreased, we would find higher average FTE earnings, since we expected these to be the department heads.

We found no strong pattern or relationship between the percent of time devoted to patient care and average FTE earnings. If anything, a "U"-shaped curve exists for the pathologists and radiologists. A large drop in average FTE earnings occurs at the point where the patient care percentage increases beyond 20 percent. Then, a big increase in average FTE earnings occurs again where the percentage of patient care rises above 70 percent. For the anesthesiologists, no pronounced pattern emerged.

4. Area variables-

We examined a number of these variables, such as per capita incomes, occupancy rates in the county, and physician to population and physician to hospital bed ratios, in the hope that these would provide some indications of the degree of competition among hospitals in the area for the services of HBPs. We hypothesized that where such competition was more intense, the earnings of the HBPs would be greater.

From the data we had available, we found no discernable pattern between these indicators and the earnings or type of compensation arrangement.

Conclusions

Our major findings for the specialties of radiology, pathology and anesthesiology were the following:

- The three specialty departments contribute significantly to the total gross charges (23 percent) and total fully-allocated costs (17 percent) of their hospitals.

- Total HBP remuneration represents a significant portion of the total direct costs in these departments (ranging from under 30 percent in pathology to over 70 percent in anesthesiology).

- Average earnings per FTE HBP were: radiologists--$103,200, pathologists--$98,400, and anesthesiologists--$80,000.

- The average FTE earnings of HBPs are closely associated with the type of compensation arrangement. Salary arrangements are associated with lower average FTE earnings (e.g., $52,600 for radiologists), and percentage arrangements with higher average FTE earnings (e.g., $124,400 for radiologists).

- Salaried physicians are very prevalent in teaching hospitals, and HBPs in teaching hospitals thus have lower average FTE earnings than in nonteaching hospitals.

- HBPs in small hospitals tend to earn more on an FTE basis than those in medium and large hospitals.

- Average FTE earnings vary by region, with generally higher averages in the West (e.g., $141,600 for pathologists) and North Central regions, and lower ones in the South and Northeast (e.g., $71,300 for pathologists).

- HBP average FTE earnings appear to be higher the greater the share of the hospital's revenues from cost reimbursement.

- The average FTE earnings of HBPs are closely associated with the gross revenues and net revenues (gross revenues less allowances, discounts, bad debts, and charity) of the departments in which they work.

DESCRIPTIVE ANALYSIS OF RADIOLOGY, PATHOLOGY, AND ANESTHESIOLOGY

E. ANALYSIS OF HBP CONTRACTS

The intent of this section is to describe the provisions of hospital-based physicians (HBPs) contracts for both general informational purposes and to help interpret the quantitative data presented in Section D, particularly with regard to differences in fringe benefits and operating costs between physicians compensated on a salary and those compensated on a percentage basis.

This section is arranged in four parts. They are: (1) introductory comments regarding the sample and qualifications to our analysis; (2) an overview of major HBP compensation arrangements; (3) a detailed description for the salary and percentage contracts of major contractual provisions and their prevalence; and (4) a concluding section stressing the implications of the contract analysis for the interpretation of the earnings differences between the HBPs on salary versus those on percentage arrangements.

The Sample and Some Qualifications

A total of 185 written contracts were reviewed for form and content. Table E-1 indicates the number of sample contracts by physician specialty and compensation arrangement. The percentage arrangements dominate our sample, representing over 60 percent of

TABLE E-1

NUMBER OF WRITTEN CONTRACTS BY SPECIALTY AND TYPE OF REIMBURSEMENT ARRANGEMENT

Specialty	Salary	Percent of Gross or Net	Salary Plus Percent	Fee-for-Service	Salary or Percent	Total
Anesthesiology	7	11	1	9	2	30
Pathology	13	48	12	4	1	78
Radiology	3	57	7	10	0	77
Totals	23	116	20	23	3	185

The accompanying text is an integral part of this table.

all contracts. The sample sizes for salary, salary plus a percentage, the choice of salary or percentage, and fee-for-service (including direct billing) are relatively small. Therefore, the generalizations we present below reflect mainly the influence of the percentage contracts.

A few qualifications should be kept in mind in reading the contract analysis.

- First, written contracts account for less than half of the total number of arrangements between HBPs and hospitals; the rest are less formal, often oral, arrangements. Some hospital administrators interviewed indicated that there was a trend toward oral agreements and that many existing written contracts had been amended in this manner. Others maintained the opposite, stating that they were currently engaged in an effort to obtain written contracts for all of their agreements with HBPs. Nevertheless, a significant percentage of the agreements effective for 1975 were less formal arrangements and many of the written contracts available were more than five years old. Thus, for the three major specialties in this study, we have over 1,200 HBPs in the sample, yet less than 200 written contracts. Even allowing for the fact that many of the written contracts are with groups of HBPs, and therefore include several HBPs, the significance in our sample of unwritten contractual arrangements is apparent.

- Second, each contract is unique in some significant aspect. This makes generalizations difficult, and they should be treated cautiously.

- Third, distinctions in the HBP compensation methods are generally not clear cut. Rather, there is a blending of features along an entire spectrum. For instance. salary plus a percent of gross billings is a middle ground between the pure salary and percentage arrangements. This is complicated further by contracts which are salary or percentage and do not fit into either category.

- Fourth, there is wide variation in the formality and specificity of the contracts, ranging from oral agreements through brief informal notes to detailed legal agreements. Where provisions are not expressly stated, we can only guess at what they might be.

- Finally, our sample of contracts may not be representative of all HBPs because it was not selected randomly.

Overview of Compensation Arrangements

Although we concentrate our analysis on the percentage and the salary contractual arrangements, a wide range of contract types does exist, and we will briefly describe several of the major types before focusing on the salary and the percentage arrangements.

- Salary contracts: The contractual provisions of salaried HBPs generally were more restrictive than were those of other HBPs. This was primarily due to the fact that salaried HBPs were, in about three-quarters of the cases, hospital employees. When HBPs were paid a salary, but considered to be independent contractors, the contracts were written more like those for HBPs reimbursed on a percentage basis.

- Percentage contracts: Because percentage arrangements are by far the most common in our sample, they play a dominant role in shaping the generalizations we present below in the characteristics of HBP contracts. The types of percentage contracts also vary considerably, but the main ones are percent of net and percent of gross.

- Salary plus a percent: These contracts can be considered a combination of earnings guarantee with a financial incentive. The contractual provisions do not differ greatly from the straight salary or the percentage contracts, and, therefore, the difficulty in classifying them as either a percentage or a salary contract is not particularly significant for this analysis.

- Fee-for-service: Instead of combining both hospital and HBP revenues and then calculating a percent, these contracts provide for the HBP to be paid based on the volume of services provided at a fixed rate for each service. Either the hospital or the physician might bill the patients, and either could accept responsibility for the bill collection. When the hospital did the billing, the amount paid to the HBP was often less than the amount charged to the patient, the difference covering administrative and overhead costs of the hospital.

- Salary or percentage: A few contracts provided for a percentage arrangement, but with a guaranteed minimum (i.e., salary). Again, these contracts are difficult to classify but do not vary significantly from the types of contracts we focus on in this analysis.

The distinctions are discussed in more detail later in the text; the point here is that for purposes of the contract analysis, we combined all forms of percentage arrangements into one major contract category.

Description of the Contractual Provisions for Salary and Percentage Contracts

In this discussion, all contracts are usually combined for most generalizations. For example, where the claim is made that 50 percent of the contracts specify a certain thing, this means half of all 185 contracts. The distinction between salary and other contracts is noted where important.

The description of all contractual provisions follows the general format of a single typical HBP contract. Hospital duties are specified, followed by a statement of HBP duties and responsibilities and ending with a variety of mutual concerns such as reimbursement, termination, term of contract and others.

- Recitation: Each contract began with a recitation of of mutual interest and intents which was stated as follows: The hospital owns a department for which it is in need of staff. The individual doctor or group practice, being licensed and qualified to provide the needed services, is willing and anxious to do so. In order to formalize the agreement between the two parties, a written contract, dictating terms and conditions, was drafted.

- Physical facilities: Regardless of the specialty or the type of compensation arrangement, the physical space needed to operate the department was always provided by the hospital. In a few pathology contracts, the space provided may have been minimal, since the pathologists involved also owned outside laboratory facilities. But even in these cases, the hospital provided space needed within the hospital.

- Equipment and equipment repair: The contractual treatment of maintenance of equipment was more variable. For those doctors on salary and employed by the hospital, equipment and equipment repairs were always provided by the hospital. For salaried doctors acting as independent contractors the situation was, on occasion, slightly different. In a half-dozen or so cases, the doctor was required to lease, purchase or maintain some or all of the necessary equipment. In a few other cases, the HBP was required to make some or all of the equipment repairs. As might be expected, those doctors required to provide equipment were also more likely to be required to share maintenance expenses.

  Slight variations were seen by specialty. Pathologists and anesthesiologists were more likely to be required to provide equipment and equipment repair than were radiologists, but since the number of contracts specifying the HBP financing of equipment were rare, these differences may not be generally applicable.

- Routine services and utilities: Routine services specified in contracts include such items as custodial care, in-house messenger service, laundry, administration, purchasing, medical records, accounting and engineering. Utilities include gas, water, heat, light, power and electricity.

  In every contract which dealt specifically with utilities and routine services, the hospital was obligated to provide them. The only time the HBP was required to pay for any of these items was when he was using the hospital for his own private practice. Under those circumstances some hospitals required the HBP to reimburse some or all of the direct costs attributable to these private care patients.

- Supplies: Supplies were defined broadly and included everything from medical supplies to office supplies. The hospital acted as the purchasing agent and would often explicitly state that doctors must follow hospital practices when ordering supplies. HBPs who were employees of the hospitals (not independent contractors) were always provided necessary supplies, but doctors functioning as independent contractors under various reimbursement mechanisms occasionally were treated differently. In seven cases, HBPs were required to provide all of the departmental supplies. Six of the seven cases involved pathology contracts. All seven cases dealt with group practices that were clearly functioning as independent contractors (in every case where supplies had to be furnished by the HBPs, they also supplied all equipment).

- Personnel: The HBP or, more often, the HBP group was sometimes responsible for paying the costs of all necessary physician coverage and, in a few cases, the costs of other highly trained persons. The hospital usually paid the nurses, technicians, orderlies, ward secretaries and other support personnel.

  In this area, a major difference exists between salaried and nonsalaried HBPs. In nearly every percentage contract, the HBP is required to provide, by himself or through others and at his expense, all the needed professional services. It is expected, for instance, that he will provide adequate medical coverage at all times even when he cannot work himself. Other professional personnel can serve two functions. They can provide needed coverage when the HBP is absent or the workload heavy, or, in a few cases, they can provide services for which the HBP is not trained.

  For HBPs who are salaried employees, such personnel coverage is not required. Exceptions for salaried physicians acting as independent contractors are few and then expressly stated, as in the case of providing vacation coverage.

  Nonprofessional personnel were provided by the hospital in all but a few instances. Salaried HBPs never were required to provide nonprofessional personnel, and even though percentage contractors might be responsible for hiring and firing of these people, they too were rarely required to pay their salaries.

- Departmental decisions: There was never an instance where one party, either the hospital or the HBP, had total authority over departmental decisions. Some approval or feedback was always required from one party before the other party could act. In more than 85 percent of the cases, however, the HBP was the primary decision-maker and was given considerable administrative authority.

  Thus, the physician was likely to be in charge of ordering equipment and supplies, hiring and firing of personnel, setting time schedules, budgeting, supervision of personnel and general departmental functions. Where restraints were included, the hospital relied on contractual provisions that required the HBP to obtain prior approval from the hospital for key decisions or that required the HBP to work within established hospital norms and policies.

- HBP as a medical staff member: The HBP is always a member of the hospital medical staff, and the continuance of the contract is often dependent on the HBP's retaining

his membership. As a medical staff member, the HBP is expected to provide consultations with other hospital physicians; to participate in teaching programs; to assist other medical staff in preparing clinical reports, research or publications; and to conduct himself and his department in such a way as to enhance the reputation and the position of the hospital.

Requiring medical staff membership also acts as a means of regulating the HBP's professional behavior. The medical staff generally will specify the types of routine service that the HBP must provide. They may also set standards for determining the amount of emergency coverage that must be provided, or the hours of the day during which the physician is to be in the hospital. In an even broader sense, the medical staff can review the HBP's professional services to assure that they are necessary, timely and effective.

. Other professional standards: In addition to any sanctions that the medical staff might place on the HBP's behavior, the contract very often includes a provision binding the HBP to the accepted professional standards within his specialty.

. Limits of hospital supervision: In every contract there was some indication that the HBP was to have a degree of independence with regard to his practice. Although there may have been stronger or weaker statements in this regard, in general the hospital's sole interest was to assure that work performed is competent, efficient and lawful. Beyond these requirements, the hospitals generally recognized that the HBP is a professional and that they must not attempt to dictate the methods which the HBP may employ in the treatment of his patients. Although these restrictions on hospital interference are universal in nature, as might be expected, they were strongest when referring to independently contracting HBPs.

. HBP supervisory responsibilities: Ninety percent of the contracts required the HBP either to supervise the department or to act as its head. The only exceptions arose when the contract involved an associate or assistant HBP. Since salaried HBPs were more likely to be assistants than were other HBPs, the number of HBPs acting as department heads was proportionately less among those paid by salary.

Because roughly 75 percent of the contracts were with group practices or physicians who might form a group at a later date, a means of selecting the department

head was often specified. Contracts involving a single HBP could simply designate the HBP as the departmental director. Contracts involving established groups would either specify a particular doctor within the group to act as the department head, or the contract would establish procedures for electing a department head from the group. Regardless of the means in which the department head was chosen, the hospital was given the opportunity to approve the original director or any replacements.

Once the provisions for selecting a department director were established, the contracts specified his duties. Some details of the director's responsibilities were outlined, but since he was to be responsible for the effective and efficient operation of the department, he was most often given a wide range of personal discretion. As already stated, the doctor has major responsibility for making departmental decisions. The hospital would, in general, rely on broad performance standards and their rights to final approval in order to assure proper departmental operations. Performance standards were likely to require only that the patients receive timely and effective care, that the department be efficient in its operation, and that the director and the department employees adhere to hospital policy.

. General HBP responsibilities: The hospital, being primarily concerned with results, usually placed rather broad contractual demands on the HBP. In only about 25 percent of the contracts were specific hours or work days mentioned. The amount of time to be devoted to various duties was specified in approximately 10 percent of the contracts, but then only generally. (Also, only three contracts provided restrictions on the number of patients that each doctor within a group could see, in effect specifying HBP/patient ratios.)

The most commonly used means of specifying HBP performance was to use language similar to the following: The director shall devote sufficient time and effort to assure that patients receive the best possible care, and he shall further provide, to the best of his ability, for the proper management of the department.

. Specific HBP responsibilities: When circumstance warranted it, more specific provisions were included in the contract. These steps were necessary when the hospital wished to guarantee that certain services were performed. Although many of these provisions were of concern to hospitals generally, some items were included as a result of circumstances unique to the area or the contracting parties.

a. Teaching: The requirement that the doctor participate in hospital teaching or educational programs was virtually universal for all types of contracts. Furthermore, in 95 percent of the cases, the HBP received no additional compensation for these services even when acting as an independent contractor.

b. Coverage: When the HBP was acting as an independent contractor, he always had to provide his own coverage for his own absences. The amount of coverage required varied, since the needs of the patients and the hospitals varied. However, most contracts specified full-time coverage and were not limited to specific days or hours.[1] Under these circumstances, every HBP was required to provide total patient coverage at his own expense, unless he was a salaried hospital employee or an associate HBP. Coverage was required during illness, vacations and educational leaves, as well as at night and on weekends.

The coverage could be provided by the individual HBP, the group practice or hired professional personnel. All arrangements had to be with written approval of the hospital unless specifically permitted by the contract.

c. Employee health care services: In nearly every instance, the HBP was required to provide employee health services. These services might include pre-employment physicals, on the job injuries, or general employee benefits for hospital employees.

In about 80 percent of the cases, the HBP was not reimbursed for these services. In the remaining instances, the independent contracting HBP could bill the hospital directly.

d. Additional requirements: The following additional services were occasionally required of the HBP:

1. Research--15% of all contracts.
2. Responsibility for transportation of patients--1% of all contracts.

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[1]Small rural hospitals may only need a HBP on a limited, visiting basis. Under these circumstances, provision or coverage would not strictly apply. The HBP is likely to have only clearly specified time obligations, not full-time coverage.

3. Special services for patients (e.g., reading of pre-op chart films or blood work) clearly specified--5% of all contracts.
4. Autopsies--20% of all pathologists' contracts.
5. Special patient record requirements--10% of all contracts.

- Restrictions on use of facility and outside practice: In 80 percent of the contracts, the HBP was prohibited from using any portion of the hospital facilities for his private medical practice. The remaining 20 percent were widely varied on their approach toward private use of the facility; some requested that the HBP reimburse costs, others took a percent of the revenues, and still others placed no restrictions at all. Likewise, the restrictions on outside practice were widely varied. Roughly 60 percent of the contracts imposed mild restrictions, only requiring that hospital business have first priority and that the private practice not interfere. More strict restraints included: bans on competition within the area; bans on expansion; prohibitions on outside research, teaching and consulting; and even total bans on outside practice. These more stringent requirements accounted for roughly 35 percent of all contracts. The remaining 5 percent had no restrictions beyond the limits imposed by the rest of the contract.

- Other contract provisions:

  a. Malpractice insurance: Whether or not the hospital provided malpractice insurance was dependent almost entirely on whether or not the HBP was a hospital employee. In 98 percent of the cases in which the HBP was a salaried hospital employee, the hospital paid for malpractice insurance. Likewise, in all but one of the contracts involving independent contractors, (whether they were on a percentage reimbursement basis or not), the cost of malpractice insurance was borne by the HBP. Refer to pages V-43 to V-45 for a discussion of the significance of this cost factor.[1]

  b. Duties specifically excluded as HBP's responsibility: In approximately a dozen contracts, certain duties were specifically excluded from the list of HBP duties. Examples of these exclusions include a radiology contract that excluded nuclear medicine,

[1]We have also been informed of an unpublished study of malpractice insurance premium costs performed by the Health Care Financing Administration, Office of Policy, Planning, and Research. The study was conducted in support of section 224 of Public Law 92-603 (Social Security Amendments of 1972), and was based on information supplied by the largest provider of medical malpractice insurance in each of the 50 states. The average annual malpractice insurance premiums paid in 1975, as determined by this study, were: Radiologist $1,430, Pathologist $997, and Anesthesiologist $5,625.

a pathology contract that excluded computerized procedures, and a pathology contract that excluded blood bank work.

c. Charity and courtesy services: Roughly 85 percent of the contracts provided for the HBP to either reduce or forgive charges for charity work and services provided as a professional courtesy. When charges were made, the doctor was required to accept the amount collected as total compensation for services rendered.

d. Medicare: Although fewer than one-third of all the contracts specifically addressed this issue, it is one with which almost every hospital and HBP would be concerned. Medicare regulations require the HBP to sign an authorization for the hospital to collect combined fees. In addition, for reimbursement purposes, the professional component of the combined bill must be identified. After identifying the professional fee, the proportion attributable to patient care must be identified so that this portion may be reimbursed under Medicare Part B. Some contracts expressly state these conditions while others do not.

. Billing: In at least 90 percent of the contracts, the hospital, in collecting its own fee, also collected the HBP's professional fee. In 90 percent of the cases in which the hospital acted as the HBP's billing agent, the service was without charge. In the remaining 10 percent of cases, the HBP was either charged a direct billing fee, or billing costs were deducted from gross charges before computing the HBP's percentage.

Billing arrangements were more varied among percentage type contracts than among salaried HBPs, since salaried HBPs were virtually all provided with what in effect is free billing services. The 10 percent of the contracts in which the hospital did not collect the professional fee was composed primarily of fee-for-service contractors.

. Setting fees: Since the hospital is, in most cases, collecting the combined fee for the hospital and physician, there are two fees that must be set by both parties. The hospital is granted total autonomy in setting its fees; the physician has varying autonomy ranging from hospital approval to requiring only that the fees established be within local norms. In 80 percent of the cases, however, the decisions on fees, like the decisions on departmental operations, were made jointly and required mutual approval. Once established, the fees could be renegotiated, but only with the written approval of the parties involved.

The percent reimbursement contracts provided the greatest amount of HBP input. Most salaried doctors were merely consulted and were less likely to be allowed to unilaterally set the fees.

. Separately billed services: In at least 25 percent of the contracts, the HBP was permitted to bill for certain services and thereby be reimbursed beyond the usual contract reimbursement provisions. Examples of services billed separately included autopsies, hospital employee health services, blood bank, x-ray special procedures and radiation therapy.

When services were billed separately, the HBP was responsible for collecting the fees in the majority of cases. There were, however, cases in which the hospital collected these separately billed charges as well.

Salaried doctors very seldomly billed for separate procedures, since they were usually responsible for all necessary hospital services.

. Departmental accounting: It was the HBP's responsibility to report the number and the types of services rendered. These reports were made daily and were required in at least 90 percent of the contracts. Type of compensation made little difference in the reporting requirement.

. Determination of HBP compensation under percentage-type contracts: As we noted earlier, the percentage type contractual arrangements are generally grouped into two major categories--percentage of gross and percentage of net. The distinction between the two categories hinges on the calculation of a base, to which a percentage rate is then applied in order to determine the HBP's compensation amount. In actuality, the determination of the base is made in a wide variety of ways, and it is difficult to force a classification scheme on these divergent methods.

Nevertheless, for analytical purposes, a classification is useful, and in this study we have used the following definitions to distinguish between percentage of net and percentage of gross compensation arrangements.

The sequence of accounting steps involved in our definitions are:

a. Billed charges (excluding charges recorded for accounting purposes only, such as for courtesy care). If a percentage rate is applied, this is considered for purposes of this study a percentage of gross arrangement. This occurred in about 15 percent of the contracts we reviewed.

b. From billed charges, an allowance for bad debts and contractual allowances is often applied, in recognition of the fact that not all billed charges represent actual revenues received. This occurred in about 85 percent of the contracts reviewed.

c. Other deductions are also often made which reflect the expenses which must be paid before the HBP's compensation is determined. Examples of these and their frequency of occurrence in our contracts are:

(1) Charity care - 80%.
(2) Hospital employee services - 80%.
(3) Professional courtesies - 80%.
(4) Expenses for technician call back - 10%.
(5) Direct department expenses - under 5%.
(6) Special equipment fund - under 5%.
(7) Depreciation - 1%.
(8) Billing costs - under 5%.
(9) Deductions made to patients participating in research - 5%.

If a percentage rate is applied to the base determined after the deductions described in items b. or c. above, then in this study, this is referred to as a percentage of net arrangement.

. Incentives: Approximately 5 percent of the contracts provided the doctor with additional income incentives. These incentives were based on departmental income, departmental costs, or both. Specific plans varied, but in general, the HBP was either given additional monies if services increased, or was asked to pay a portion of added costs if department costs rose above a set amount.

. Termination and assignment of rights: Fewer than 2 percent of the contracts allowed the HBP to assign his rights and duties under the contract without prior written approval; all contracts allowed the HBP to make assignments with written approval.

Virtually all contracts allowed termination with notice. The amount of notice required varied, however. The most common notification period was 90 days, but 60 days and 120 days notification periods were not uncommon.

In roughly 10 percent of the contracts, provision was made for the HBP's dismissal for cause. These arrangements were usually found in the most formal contracts, less formal contracts relied on loss of required medical staff membership to dismiss the HBP.

- Length of contract: Contracts varied in length from one year to six years, and in several cases the contract was open ended.

  Pathology contracts tended to be of the longest duration, while anesthesiology tended to be of shortest duration.

- Other benefits: HBPs reimbursed on a percentage basis received almost no fringe benefits. In a handful of cases, the HBPs on a percentage arrangement were allowed to participate in an annuity or a pension plan, or were given vacation time. Salaried HBPs received considerably more benefits, especially if they were not independent contractors.

  A brief list of other fringe benefits that were included mainly in the various salary contracts includes: pensions, annuities, health and life insurance, malpractice insurance, books and research materials, equipment, vacations, sick leave and educational leave.

Implications for Interpreting Earnings Differences

Table D-4 (page II-31) showed very large differences in average FTE earnings for those HBPs reimbursed by salary versus a percentage method; these differences ranging from a low of $25,000 annually for anesthesiologists to over $70,000 for radiologists and almost $90,000 for pathologists. In Section D, we analyzed some of the reasons for these differences by combining earnings data with hospital and area characteristics. Added insights into the causes of these disparities can be gained from the contract analysis.

There are two aspects of the contract provisions worth exploring when interpreting these earnings differences. One is whether the services performed by salaried physicians equates to those of the percentage contractor. The second is the extent to which the percentage contractor must use his gross earnings for expenses not borne by the salaried physician.

There appears to be little difference in the services required of physicians reimbursed on a salary versus the percentage contractor basis. As far as we can tell, they are equally responsible for such things as providing employee health care and supporting research efforts without added remuneration.

The big difference between salary and other methods of payment lies in the fringe benefits provided to employees and the expenses paid from gross earnings of the percentage contractor. The following tables summarize these differences:

TABLE E-2

BENEFITS PROVIDED BY HOSPITAL

Usual Fringe Benefits	Salaried Employees	Percentage Contractors
Vacation	yes	no
Sick leave	yes	no
Education leave	yes	no
Pension plan	yes	no
Malpractice insurance	yes	no
FICA	yes	no
Tax shelters	if available	no

TABLE E-3

EXPENSES PAID BY HBP

Expenses of Operation	Salaried Employees	Percentage Contractors
Other needed professional staff	no	yes
Nonprofessional staff	no	usually no
Equipment repair and maintenance	no	sometimes
Depreciation	no	usually no

The accompanying text is an integral part of the above tables.

The actual cash value of the fringe benefits and expenses can only be determined on a case-by-case basis. The combined value of the vacation and other paid time off, the malpractice insurance and the retirement benefits certainly could run as high as or higher than 25 percent of earnings. This should be kept in mind when making gross earnings comparisons.

Conclusions

The major findings of our contract analysis are summarized below:

- A significant percentage of the arrangements between hospitals and HBPs are oral. Written contracts account for less than half of the total number of arrangements between the HBPs and hospitals in our sample. Since our analysis was restricted to written contracts, the findings may be somewhat biased.

- Salary compensation arrangements tend to take an oral form; percentage arrangements are more likely to be written contracts. As a result, the contracts which were analyzed were predominantly percentage arrangements and our findings apply primarily to them.

- Approximately 75 percent of the contracts were with group practices or physicians who might form a group practice.

- Every contract analyzed was unique in some respect. The contracts varied considerably in length, formality, terms included and specificity. As a result, generalizations are difficult and they should be interpreted with care.

- Distinctions between HBP compensation arrangements are generally not clear cut. It was sometimes difficult to classify a contract into one of the standard arrangement categories (salary, fee-for-service, percent of net, percent of gross, combination and other), and it was because of this difficulty that the "other" category was used. This problem also led us to combine the two percentage arrangements into one category for our analysis.

- The primary finding in relation to our analysis of the descriptive tables was that HBPs compensated under a percentage arrangement tend to receive far fewer fringe benefits, and pay more of their department's expenses, than do HBPs compensated under a salary arrangement. This finding tends to reduce some of the significance of the large differences found in our descriptive analysis between the average FTE compensation of these two types of compensation arrangements.

DESCRIPTIVE ANALYSIS OF RADIOLOGY, PATHOLOGY, AND ANESTHESIOLOGY

F. COMPARISON OF FINDINGS TO PREVIOUS STUDIES

Introduction

There have been several previous studies that have dealt with issues related to this segment--particularly with trends in various methods of compensation of hospital-based radiologists and pathologists. The purpose of this section is to present a brief summary of the extent to which our study supports, contradicts or is not comparable with the following previous studies:

1. Hospital-Based Specialists Study: Pathologists' and Radiologists' Arrangements with Hospitals, 1965-1968, Frank Van Dyke, et. al., Columbia University School of Public Health and Administrative Medicine, October, 1968.

2. "Hospital-Specialist Compensation Plans," Catherine M. Begole, et. al., American Hospital Association's (AHA) Bureau of Research Services; an article printed in Hospitals, April 16, 1972.

3. "Hospital Physicians: How They Are Paid and How Much," Robert M. Blakely, A. T. Kearney, Inc.; an article printed in Modern Hospital, August, 1973.

Distribution of HBP Contractual Arrangements

All three studies compare the frequency of certain types of contractual arrangements for radiologists and pathologists for selected years. The Columbia study covered 1965, 1966, 1967 and 1968; the AHA study 1965 and 1969; and the Kearney study 1972 (versus the AHA's 1969 data).

In attempting to compare the results of these studies to our findings, a variety of methodological differences were identified which make direct comparison difficult. For example:

- All three of the other studies report on the frequency of occurrence of certain categories of contractual arrangements in terms of the percentage of hospitals covered by the study. The Columbia study also presents the same data in terms of the percentage of beds covered by the study. Our findings are presented in terms of the percentage of HBPs covered by the study.

- The Columbia and Kearney studies cover only department heads (chiefs), to avoid the situation where two or more arrangements exist within the same department. The article on the AHA study does not clarify how they dealt with this situation. Our findings include all HBPs and recognize each separate contract within a department.

- All three of the other studies report separate data for percentage of net and percentage of gross. Our findings usually combine these two arrangements into one category representing all percentage arrangements, but for comparative purposes in this section the distinction will be made.

- All three studies use the term "fee for service" to describe one arrangement category. When this term is defined it is clear that it includes arrangements which were grouped into two or three different categories in our study--fee for service, direct billing and, perhaps, other (for example, leasing arrangements). For comparative purposes, our categories of "fee for service" and "direct billing" will be combined into the fee for service category in the table, below.

- The definitions of the "percent of gross" and "percent of net" categories are not consistent. The Columbia study, for example, includes in the "percent of gross" category cases in which gross departmental billings may be adjusted for (a) bad debts, (b) free care, and/or (c) third-party allowances, prior to calculating HBP income. In our study, the existence of one or more of these adjustments led to a classification of "percentage of net."

. There are considerable differences in the number of different arrangement categories recognized in the studies, leading to variations in the precision of the assignment of specific cases to the arrangement categories. For example, the Columbia study which had the largest number of categories (17) has the highest percentage of cases in the "other" category in the table, below.

Table F-1 presents a comparison of the results of the three other studies to our findings. The table seems to indicate that our sample contains a disproportionately large number of salary arrangements and a disproportionately small number of percentage (gross and net combined) arrangements. These apparent differences may be partially explained by the fact that, as previously discussed, the AHA and Kearney figures represent percentages of the hospitals covered by their studies. If percentage arrangements are more prevalent in small hospitals and salary arrangements are more common in large hospitals, then the AHA and Kearney figures would be expected to be lower for salary arrangements and higher for percentage (combined) arrangements than our figures, which represent percentages of HBPs covered by the study. It is interesting to note that our figures for salary and percentage (combined) arrangements are not significantly different from the comparable Columbia figures, which represent percentages of beds covered by the study.

The data in Table F-1 can also be analyzed over time to identify trends in HBP contractual arrangements. The most notable pattern is the large increase in the "fee for service" category for radiologists. Most of this increase can be attributed to a movement by radiologists to what we have termed "direct billing." Combining the results produces the following data for the percentage

TABLE F-1

DISTRIBUTION OF CONTRACTUAL ARRANGEMENTS FROM FOUR STUDIES

Specialty and Compensation Arrangement	1965		1968	1969	1972	1975
	Columbia	AHA	Columbia	AHA	Kearney	This Study
Radiologists:						
Pure Salary	13%	11%	12%	7%	6%	16%
Percentage of Gross	43	60	31	50	52	15
Percentage of Net	12	19	5	10	10	21
Fee for Service	9	6	29	27	29	36
Other	23	4	23	6	3	12
	100%	100%	100%	100%	100%	100%
Pathologists:						
Pure Salary	16%	22%	15%	17%	17%	27%
Percentage of Gross	26	42	23	35	40	12
Percentage of Net	11	16	6	11	12	25
Fee for Service	14	14	18	28	28	17
Other	33	6	38	9	3	19
	100%	100%	100%	100%	100%	100%

The accompanying text is an integral part of this table.

of cases in which some or all of the professional fees were billed and collected directly by the radiologists:

Columbia Study		This Study
1965	1968	1975
7.4%	27.6%	28.4%

Table F-1 seems to indicate that most of this movement toward direct billing come from cases that had previously had one of the percentage arrangements.

HBP Compensation Amounts

The Kearney Study is the only one of the three cited studies to report on HBP compensation amounts. Unfortunately, there are several major methodological differences between their study and ours:

- Compensation data reported by Kearney represent only the amounts paid by a single respondent hospital, and no adjustment has been made for HBPs who work only part-time in the respondent hospitals.
- Compensation data are reported by Kearney only in fairly large ranges (intervals of $20,000). No averages are calculated; rather their conclusions are stated in terms of median ranges.
- As noted previously, the Kearney Study covers only chiefs of radiology and pathology.

As a result of these differences, there are no data reported in the Kearney Study that can be compared to the average full-time equivalent earnings data reported in this study.

V. N.Y. CASE STUDIES

- CARDIOLOGY & E.R.

HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

DESCRIPTIVE ANALYSIS OF CARDIOLOGY AND EMERGENCY ROOM PHYSICIANS

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STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

DESCRIPTIVE ANALYSIS OF CARDIOLOGY AND EMERGENCY ROOM

A. INTRODUCTION

This segment of the study is an extension of the previous segment (see Segment II). That segment presented the findings of descriptive analyses performed for three hospital-based physician (HBP) specialties--pathology, radiology and anesthesiology. In this segment, the findings of comparable descriptive analyses are presented for two additional specialties--cardiology and emergency room. The information in Sections A, B, and C of Segment II apply equally to this segment (with the exception of the different specialties covered) and are not repeated here.

The questions addressed in this segment parallel those covered in the previous segment. The questions are:

- How much do the hospital-based physicians earn on a full-time equivalent (FTE) basis in the two specialties under study--cardiology and emergency room?
- Are the HBPs' earnings related to the type of compensation arrangement under which they work? The major focus here is, as before, on the differences between those HBPs who operate under a salary arrangement versus those whose compensation is based in some way on a percentage of the revenues of their department.
- Are HBP earnings and types of compensation arrangements related to certain hospital and area characteristics? Specifically:
  - hospital teaching status and complexity of services

- hospital not-for-profit or for-profit status

- region of the country in which the hospital is located

- whether or not the hospital is located in a Standard Metropolitan Statistical Area (SMSA)

- the proportion of hospital revenues obtained from third party cost reimbursers

- the portion of hospital revenues obtained under some form of prospective rate setting program

. Are HBP earnings and types of compensation arrangements related to the gross and net revenues of the HBPs' departments?

In Segment II, the relationships between a few additional variables (such as whether the HBP was a department head, county occupancy rates and per capita income) and HBP compensation were also covered. No significant relationships were found in the work for the Segment II, and the same result has generally been found for cardiologists and emergency room physicians. Hence, these items are not covered in this segment, although tables with the relevant data are available and some of these variables are included in the multivariate analysis component of this project (see Segment IV).

The major findings for the ten topic areas listed above are summarized on the following pages.

DESCRIPTIVE ANALYSIS OF CARDIOLOGY AND EMERGENCY ROOM PHYSICIANS

B. ANALYSIS OF DESCRIPTIVE TABLES

Qualifications and Background Information

The descriptive analysis of cardiologists and emergency room physicians is subject to the same qualifications as was the similar analysis of radiologists, pathologists and anesthesiologists in Segment II:

- that the compensation data reported for HBPs who work only part-time for the study hospitals have been converted to a full-time equivalent (FTE) basis,
- that the analysis excludes all HBPs who bill patients directly, and
- that the average FTE earnings reported for salaried HBPs may not be directly comparable to those reported for HBPs paid under a "percentage" (of gross or net departmental revenue) arrangement.

Each of these qualifications is discussed much more fully on pages II-16 through II-20.

Segment II also presents a summary of the departments and HBPs in the sample, which discusses all the major HBP specialties, including cardiology and emergency room. The reader is referred to pages II-20 through II-25 for that discussion. The next three paragraphs summarize that material as it relates to cardiologists and emergency room physicians.

The original sample includes 612 cardiologists and 418 emergency room physicians (refer to Table D-1 on page II-21). The

cardiologists represent only 112 FTEs (18 percent), implying that the average cardiologist spends approximately one day per week at any one hospital. This low percentage is believed to reflect tendencies on the part of cardiologists to (1) form large group practices and (2) serve several hospitals and/or have significant private practices. The emergency room physicians represent 216 FTEs (52 percent), which is consistent with the other major HBP specialties.

The decrease in sample size caused by the elimination of HBPs who bill direct is not severe in either of the specialties. In cardiology, only 33 HBPs (5 percent) have to be eliminated, leaving 579 cardiologists in the sample subject to analysis. Of the 418 emergency room physicians, 68 (16 percent) are eliminated, leaving a remaining sample of 350 HBPs.

Table D-2 (Segment II, page II-24) indicates the significance of the departments in which these two specialties practice and the significance of total HBP remuneration in these departments. The cardiology and emergency room departments, when combined, generate approximately 6 percent of gross hospital charges and 5 percent of fully-allocated hospital costs. On an individual basis, the emergency room, representing over 4 percent of gross charges and 4 percent of total costs, is more significant than the cardiology department. Total HBP compensation represents almost 65 percent of the total direct departmental costs in cardiology, and almost 49 percent in the emergency room.

HBP Earnings

The information on average FTE earnings is derived from a sample (after eliminating all HBPs who bill patients directly) of 579 cardiologists and 350 emergency room physicians. Basic earnings data for these two specialties are presented in Table B-1. The table shows that cardiologists have average annual FTE earnings of around $63,000, while emergency room physicians have a lower average of around $55,000. However, the fairly large standard deviations, especially for cardiologists, suggest that quite a few of the HBPs earn considerably more or considerably less than the average. This can be seen more clearly by the percentage distribution figures presented in Table B-1. These figures show the proportion of the HBPs in various FTE earnings categories.[1]

The table shows that nearly 90 percent of the cardiologists and nearly 95 percent of the emergency room physicians obtain FTE compensation amounts of less than $100,000. These are considerably lower amounts than those for the radiologists, pathologists and anesthesiologists, which were presented in Segment II. None of the emergency room physicians had FTE compensation amounts of over $200,000, and only two percent of the cardiologists were in the $300,000 to $400,000 FTE compensation range.

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[1]Note that the earnings categories used throughout this segment are different than those used in Segment II. This was necessary to show meaningful earnings distributions, due to the lower average FTE earnings found for cardiology and emergency room.

TABLE B-1

FTE COMPENSATION AMOUNTS BY SPECIALTY

Specialty	Sample Size[a]	Average FTE Earnings[b]	Standard Deviation[b]	Percentage of HBPs with FTE Earnings in the Following Categories[c]			
				Less than $50,000	$50,000-$100,000	$100,000 or More	$300,000-$400,000
Cardiology	579	$63,000	$56,100	45%	44%	11%	2%
Emergency Room	350	54,700	28,200	59	35	6[d]	none

[a]Excluding those HBPs who bill patients directly.

[b]Rounded to the nearest $100.

[c]The percentages in the first three columns will add to 100%, except for discrepancies due to rounding.

[d]No emergency room physicians had compensation over $200,000.

The accompanying text is an integral part of this table.

FTE Earnings and Type of Compensation Arrangement

As explained in Segment II, in the detailed descriptive tables generated for this study a number of different compensation arrangements are included. Specifically, the detailed tables present data for the following types of compensation arrangements:

1. Salary
2. Percent of Net
3. Percent of Gross
4. Combination
5. Other
6. Direct billing

In this summary presentation, however, the emphasis is on two of these arrangements. The first is the salary arrangement. The second is called the "percentage arrangement". This latter arrangement includes the categories in the detailed tables labeled as percentage of gross and percentage of net. Technically, the percentage of gross arrangement is one in which the HBP obtains some percentage of the gross billed charges of the department in which he works. No deductions are made from the billed charges in determining his compensation. The percentage of net arrangement is one in which some deductions are subtracted from departmental billed charges, and then the HBP obtains a percentage of the remainder. These deductions commonly include bad debts, contractual adjustments, charity care, hospital employee services and professional courtesies. More details on the nature of these deductions are presented on pages II-68 and II-69.

These two percentage categories were combined into one for purposes of this presentation for two reasons: First, both percentage arrangements should create similar incentives for HBP behavior, since in each case the HBP's compensation depends heavily on the total amount of billed charges. Second, in many instances the distinction between percentage of net and percentage of gross is not clear-cut and has to be made somewhat arbitrarily.

The data for cardiologists and emergency room physicians on salary and percentage arrangements are shown in Table B-2. A smaller proportion of the cardiology and emergency room HBPs are under salary or percentage arrangements than is the case for the other three specialties (radiology, pathology and anesthesiology). Only 17 percent of the cardiologists are under one of these arrangements, while slightly over half (54%) of the emergency room physicians are under one of these arrangements.[1]

As is the case for the other specialties studied, the amounts of FTE compensation received by those on percentage arrangements are considerably greater, on the average, than is the case for those on salary arrangements. This applies to both specialties, and is readily apparent from both the averages and the compensation distribution figures shown in Table B-2.

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[1]These percentages are calculated using as a base the number of HBPs in each specialty for which we have earnings figures. The denominators are therefore 579 cardiologists and 350 emergency room physicians.

TABLE B-2

COMPENSATION ARRANGEMENT BY SPECIALTY[a]

Specialty and Compensation Arrangement	Sample Size[c]	Average FTE Earnings	Percentage of HBPs with FTE Earnings in the Following Categories[b]		
			Less than $50,000	$50,000-$100,000	$100,000 or More
Cardiology - Salary	46	$39,800	91%	9%	0%
Cardiology - Percentage	51	86,400	4	71	25
Emergency Room - Salary	108	40,400	83	17	0
Emergency Room - Percentage	80	74,900	30	66	4

[a]Excluding those HBPs who bill patients directly.

[b]The percentages will add to 100%, except for discrepancies due to rounding.

[c]These sample sizes represent the number of HBPs in these two specialties that had either a pure salary or a pure percentage arrangement. All arrangements that involved a combination of salary and percentage, and all other arrangements were eliminated from this analysis.

The accompanying text is an integral part of this table.

Thus, the findings strongly suggest that HBPs under percentage compensation arrangements earn considerably more than those who are paid a salary. However, it is important to keep in mind when making such comparisons that the HBP on a percentage arrangement often must cover costs out of his compensation which the HBP on a salary does not. A more complete discussion of this issue is presented on pages II-71 and II-72.

Hospital Teaching Status and Complexity of Services as Related to FTE Earnings and Type of Compensation Arrangement

As noted in Segment II, one of the major efforts was to relate the amount and type of HBP compensation to various hospital and area characteristics, such as teaching status, bed size, region and so forth. The variable found to be most strongly associated with FTE earnings and with type of compensation arrangement was the hospital's teaching status.[1]

A hospital was defined to be a teaching hospital if it met any of the following conditions:

1. Residency or internship approved by AMA (November, 1974) or by American Osteopathic Association (January, 1975).

2. Medical school affiliation, reported by AMA (November, 1974).

3. Member of Council of Teaching Hospitals of the Association of American Medical Colleges (January, 1975).

Since teaching institutions tend to pay physicians on a salary basis, and since the results presented above indicate that HBPs on salary tend to earn less (on a FTE basis) than those under a percentage arrangement, it was expected that HBPs in teaching institutions would have lower FTE earnings and would be more likely

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[1]The variable for complexity of service also showed strong association. However, because it was highly correlated with the teaching variable, only the teaching results are presented here.

to be on a salary arrangement than HBPs in nonteaching hospitals.

The results by teaching status are shown in Table B-3. For both cardiologists and emergency room physicians, average FTE compensation amounts are greater in the nonteaching than in the teaching institutions. The distributions by FTE compensation categories shown in Table B-3 also indicate higher compensation amounts for those in nonteaching hospitals for both specialties.

As shown in Table B-3, differences in the prevalence of salary and percentage arrangements between teaching and nonteaching hospitals are not great. The results for cardiology support the hypothesis, but not strongly. There is a slightly greater frequency of salary arrangements in the teaching institutions and a slightly greater frequency of percentage arrangements in the nonteaching institutions for cardiology.

For emergency room physicians, salary and percentage arrangements are equally prevalent in the teaching institutions. In the nonteaching institutions, there is a greater prevalence of salary over percentage arrangements than expected.

Thus, in general, somewhat higher average FTE compensation amounts are found in the nonteaching than in the teaching institutions for both specialties, but the differences are not as great as found in radiology and pathology. Similarly, no great difference was found in the prevalence of salary and percentage arrangements between teaching and nonteaching institutions.

TABLE B-3

FTE COMPENSATION AMOUNT AND TYPE OF HOSPITAL TEACHING STATUS

Specialty and Hospital Teaching Status	Sample Size	Average FTE Earnings	Percentage of HBPs with FTE Earnings in the Following Categories[a]			Percentage of HBPs with Compensation Arrangement[b]	
			Less than $50,000	$50,000-$100,000	$100,000 or More	Salary	Percentage
Cardiology -Teaching	277	$59,400	59%	34%	7%	14%	7%
Cardiology -Nonteaching	302	66,300	33	53	14	2	11
Emergency Room-Teaching	117	48,700	76	24	0	25	27
Emergency Room-Nonteaching	233	57,800	51	41	9	34	21

[a]Percentages will add to 100% except for rounding.

[b]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

Hospital Bed Size and Its Relationship to FTE Earnings and Type of Compensation Arrangement

For a number of reasons, HBPs in the smaller hospitals were expected to earn more on a FTE basis than those in larger hospitals. Many of the small hospitals are located in more remote areas and probably have to pay a premium to obtain the services of HBPs. The large hospitals, on the other hand, are often located in more desirable urban settings and are more likely to be prestigious institutions. Hence, physicians are more likely to be willing to work in the larger institutions and to do so for lower FTE earnings. Also, because of these factors and because teaching hospitals are more likely to engage in salary arrangements with physicians, it was expected that HBPs in the larger hospitals would be more likely to be on salary arrangements than would HBPs in the smaller hospitals.

For the analysis, three hospitals size measures were utilized, based on the number of general service beds: small hospitals of less than 100 beds, medium-sized hospitals of 100-299 beds, and large hospitals with 300 or more beds. The findings for cardiology and emergency room are generally the opposite of those found for radiology and pathology. These results are shown in Table B-4. The average FTE compensation amounts are highest for cardiologists in large hospitals, while for emergency room physicians, they are highest in medium-sized hospitals. For both specialties, the lowest average FTE earnings occur in small hospitals, which is in direct opposition to the findings of Phase I.

TABLE B-4

FTE COMPENSATION AMOUNT AND TYPE BY HOSPITAL BED SIZE

Specialty and Hospital Size		Sample Size	Average FTE Earnings	Percentage of HBPs on[a]	
				Salary	Percentage
Cardiology	- Less than 100 beds	119	$54,000	0%	1%
Cardiology	- 100 - 299 beds	178	60,900	5	16
Cardiology	- 300 and more beds	282	68,100	13	8
Emergency Room	- Less than 100 beds	25	40,000	16	32
Emergency Room	- 100 - 299 beds	170	59,200	40	19
Emergency Room	- 300 and more beds	155	52,200	23	26

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

With regard to the type of compensation arrangement, the data show a slightly greater frequency of percentage arrangements in small and medium-sized hospitals for cardiology and in small hospitals for emergency room. There is a greater frequency of salary than percentage arrangements for cardiology in large hospitals and for emergency room physicians in medium-sized hospitals. The frequency of the two types of arrangements is quite similar for emergency room physicians in large hospitals.

Thus, these two specialties do not exhibit higher average compensation amounts in small hospitals, although they do exhibit a slightly greater prevalence of percentage arrangements in small hospitals and a correspondingly greater prevalence of salary arrangements in large hospitals.

For-Profit or Not-For-Profit Status
and Relationship to FTE Earnings
and Type of Compensation Arrangement

No strong relationship between hospital profit status and compensation type and amount were found for pathology, radiology and anesthesiology because of the small number of HBPs included in for-profit hospitals in the sample. The same situation exists for cardiology and emergency room. However, for illustrative purposes, Table B-5 presents the average FTE compensation amounts for these two specialties in the for-profit and not-for-profit hospitals in the sample. As can be seen from the table, the HBPs in the for-profit hospitals show considerably greater average FTE compensation amounts, but the number of HBPs included in the for-profit hospitals is quite small. Hence, no strong conclusions can be drawn from these descriptive results.

TABLE B-5

FTE COMPENSATION AMOUNT BY HOSPITAL PROFIT STATUS

Specialty and Profit Status	Sample Size	Average FTE Earnings
Cardiology - Not-for-profit	560	$ 61,300
Cardiology - For-profit	19	114,700
Emergency Room - Not-for-profit	328	52,700
Emergency Room - For-profit	22	84,800

The accompanying text is an integral part of this table.

Regional Differences in the Amount and Type of Compensation

The sample of HBPs was drawn from across the country. Since practice patterns, price levels and compensation arrangements could vary considerably among regions of the country, HBP earnings and compensation arrangement data for the four major regions of the country were examined. The findings are summarized in Table B-6.

For cardiology, the highest average FTE compensation amounts occur in the North Central region, and the lowest in the South. For emergency room physicians, the highest average FTE compensation amounts occur in the West, and the lowest in the Northeast. Taken together, the highest average FTE earnings appear to occur in the West and North Central, and the lowest average FTE compensation amounts in the South and Northeast. These findings are generally consistent with the distribution of HBPs in teaching hospitals among the four regions, shown in Section C of Table B-6. For both specialties, the percentage of HBPs in the sample who are in teaching institutions is considerably higher in the South and Northeast (the regions with the lower average FTE compensation amounts) than is the percentage in either the West or North Central regions (the regions with the highest average FTE compensation amounts).

A strong relationship does not appear to exist between type of compensation arrangement and amount of average FTE compensation across regional lines. The expected association

TABLE B-6

REGIONAL DIFFERENCES IN FTE COMPENSATION AMOUNT, COMPENSATION TYPE, AND TEACHING STATUS

A. AMOUNT OF FTE COMPENSATION

Specialty	West		North Central		South		Northeast	
	Sample Size	Average FTE Earnings	Sample Size	Average FTE Earnings	Sample Size	Average FTE Earnings	Sample Size	Average FTE Earnings
Cardiology	89	$70,100	119	$89,500	306	$52,200	65	$55,400
Emergency Room	137	67,100	73	50,800	77	49,900	63	38,300

B. TYPE OF COMPENSATION[a]

Specialty	Salary	Percentage	Salary	Percentage	Salary	Percentage	Salary	Percentage
Cardiology	0%	15%	15%	4%	5%	7%	20%	17%
Emergency Room	8	39	58	0	21	26	62	10

C. PERCENT OF HBPs IN TEACHING HOSPITALS

Specialty				
Cardiology	39%	31%	55%	69%
Emergency Room	25	8	62	62

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

between higher average compensation amounts and a greater prevalence of percentage than salary arrangements, and vice versa, can be found in only two of the four regions -- the West and the Northeast. The percentage arrangement is more prevalent than salary in the West, and average FTE compensation amounts are generally higher in that region. The salary arrangement is more prevalent than the percentage arrangement in the Northeast, where average FTE compensation amounts are generally lower. In contrast, the percentage arrangement is slightly more common than the salary arrangement in the South, and this is a region with relatively low average FTE compensation amounts. The salary arrangement is more common than the percentage arrangement in the North Central region, a region with relatively high average FTE compensation amounts.

Therefore, there are differences in average FTE compensation amounts across regions, and these differences appear to bear some relationship to the extent to which HBPs are in teaching hospitals in the various regions in the sample. However, the data on a regional basis do not exhibit a strong association between type of compensation arrangement and average FTE compensation amount.

Standard Metropolitan Statistical Area (SMSA) Location and Compensation Amount and Type

In the research design, it was hypothesized that urban/rural differences could affect the amount and type of compensation of hospital-based physicians. It was anticipated that hospitals in nonurban areas would have to pay a premium to obtain these specialists. At the same time, the prestigious teaching institutions are generally located in urban settings. For both reasons, it was expected that FTE compensation amounts would be higher in the non-SMSAs than in the SMSAs. By the same token, it was expected that a greater prevalence of salary than percentage arrangements would exist in the SMSAs, and the opposite in the non-SMSA hospitals.

The data for the SMSA/non-SMSA comparisons are shown in Table B-7. The sample sizes in the non-SMSA areas are small, particularly for emergency room. Nevertheless, the data do suggest slightly higher average amounts of FTE compensation for cardiology in non-SMSA areas than in SMSAs. Cardiology also shows a greater prevalence of percentage than salary arrangements in the non-SMSA areas (there are no salary arrangements in non-SMSA areas among the cardiologists in our sample). In the SMSAs, the salary and percentage arrangements are equally prevalent for cardiology.

In contrast, the emergency room physicians show a higher average amount of FTE compensation in the SMSA areas; however, the sample size in the non-SMSA area is very small. The salary

TABLE B-7

SMSA LOCATION RELATED TO AMOUNT AND TYPE OF HBP COMPENSATION

Specialty and SMSA Location	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Cardiology - SMSA	520	$62,300	9%	9%
Cardiology - Non-SMSA	59	69,500	0	10
Emergency Room - SMSA	332	55,600	31	24
Emergency Room - Non-SMSA	18	38,800	28	0

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

arrangement is more prevalent than the percentage arrangement in both SMSA and non-SMSA areas.

Hence, major differences between SMSAs and non-SMSAs do not appear for cardiology, and the non-SMSA sample for emergency room is too small to produce any definitive results.

The Effect of Cost Reimbursement

We also examined the question of whether or not the amount of FTE compensation received by the hospital-based physicians increases as the percentage of patient days reimbursed by cost-based third parties increases. This might be expected to happen if the hospital had less incentive to be concerned with the compensation of the HBP as the effect of such compensation on its own net revenues diminished.

To examine this question, the percentage of hospital revenues obtained from third-party cost reimbursers was related to the average FTE earnings of the hospital-based physicians. The relevant data are shown in Table B-8. For both specialties, the average FTE compensation amounts are greater in hospitals receiving over half their revenues from cost reimbursement than is the case in hospitals receiving less than half their revenues from cost reimbursers. With regard to type of compensation arrangement, there are no strong differences for cardiology, while emergency room physicians show a greater prevalence of salary than percentage arrangement, particularly in those hospitals with less than half of their revenues from cost reimbursers.

Therefore, although the data do not reveal strong differences regarding the type of compensation arrangement, the data on average FTE compensation amounts are consistent with the hypothesis that as the share of hospital revenues from cost reimbursement increases, the HBP may be able to obtain greater amounts of FTE compensation.

TABLE B-8

COST REIMBURSEMENT AND AMOUNT AND TYPE OF HBP COMPENSATION

Specialty and Percent of Total Hospital Revenues from Cost Reimbursers	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Cardiology - 50% or less	268	$55,100	5%	4%
Cardiology - over 50%	311	69,800	11	13
Emergency Room - 50% or less	86	46,800	26	7
Emergency Room - over 50%	264	57,300	33	28

[a]Percentages will not add to 100% because not all compensation arrangements are included.

The accompanying text is an integral part of this table.

The Effect of Prospective Rate Setting Programs

The question of whether or not prospective rate setting programs appear to be related to lower average FTE earnings was also examined. To do this, the percentage of hospital revenues obtained under a prospective rate setting program was related to the FTE earnings and type of compensation arrangement of the hospital-based physicians. For the time period covered in this study (fiscal year 1975) no hospitals in the sample were totally under a prospective rate setting program; in fact, very few of the sample hospitals had over 50 percent of their revenues covered by a prospective rate setting program. The results are shown in Table B-9.

The average FTE compensation amounts were found to be higher for those HBPs not under prospective rate setting programs. In cardiology, for example, the 512 HBPs not under prospective rate setting (i.e., in hospitals with less than 10 percent of their revenues under a prospective rate setting program) had average FTE earnings of $64,900, while the 67 HBPs under some form of rate setting program had a lower average FTE compensation amount of $48,400. For emergency room physicians, the average FTE earnings figures were $57,700 in the nonprospective rate setting areas and $38,700 in the prospective rate setting hospitals.

Thus, the data are at least consistent with the theory that prospective rate setting has some downward impact on HBP earnings. However, other factors are involved which may have a

TABLE B-9

PROSPECTIVE RATE SETTING

Specialty and Percent of Total Hospital Revenues from Prospective Rate Setting[d]	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Cardiology - 10% or less	512	$64,900	7%	9%
Cardiology - over 20%	67[b]	48,400	13	9
Emergency Room - 10% or less	295	57,700	35	25
Emergency Room - over 20%	55[c]	38,700	11	11

[a]Percentages will not add to 100% because not all compensation arrangements are included.

[b]Of these 67 cardiologists, 25 are in the 20-25% prospective rate setting range, 20 are evenly distributed throughout the 25-50% range, and 22 are in the over 50% range.

[c]Of these 55 emergency room physicians, 12 are in the 20-25% range, 18 in the 40-45% range, and 25 in the over 50% range.

[d]The "10% or less" prospective rate setting range consists entirely of cases from hospitals which have no prospective rate setting. In all hospitals affected by a prospective system, at least 20% of their revenues were involved (i.e., there were no cases in the 10-20% range).

The accompanying text is an integral part of this table.

greater impact than the prospective rate setting program. For instance, all of the prospective rate setting programs in our sample are located in the Northeast region. Because of the high prevalence of teaching institutions in the sample for that region, the average FTE earnings in the Northeast are in general lower than in the other regions. For example, the average FTE earnings of all emergency room physicians is $54,700, while in the Northeast it is only $38,300. Thus, from these preliminary data, we cannot conclude that prospective rate setting has a constraining effect on the FTE earnings of hospital-based physicians. Nevertheless, in the sample, the FTE compensation amounts are lower in states with prospective rate setting programs.

Departmental Revenues and FTE Earnings
and Type of Compensation Arrangement

One of the important questions for this study is the relationship between the earnings of hospital-based physicians and the revenues of the departments in which they operate. Our hypothesis was that average FTE earnings of hospital-based physicians would be greater as the revenues (also on a FTE basis) of the departments in which they worked increased. Such a result would be expected in part due to the greater responsibility and perhaps greater productivity of HBPs in the high revenue producing departments. The findings for cardiology and emergency room are shown in Table B-10. The data in the table represent net department revenue per full-time equivalent HBP, after expenses but before any compensation payments to the HBP(s).

The table indicates that as the net revenues per FTE increase the average FTE earnings of HBPs also increase; this applies to both specialties if the three cases of emergency room physicians in the over $300,000 departmental revenue category are ignored. There is also a slight tendency for the prevalence of HBPs on salary arrangements to be greater than the prevalence of those on percentage in the lower departmental revenue categories, and the prevalence of the percentage arrangement to be greater in the higher departmental revenue categories. Therefore, the general finding is that a positive association exists between the FTE earnings of hospital-based physicians and the revenues per FTE of the departments in which they operate.

TABLE B-10

DEPARTMENT NET REVENUE PER FTE AND AMOUNT AND TYPE OF HBP COMPENSATION

Specialty and Net Revenues per FTE[b]	Sample Size	Average FTE Earnings	Percent of HBPs on[a]	
			Salary	Percentage
Cardiology - <$100K	183	$ 32,300	10%	1%
Cardiology - $100-300K	344	71,600	7	11
Cardiology - >$300K	52	114,400	8	19
Emergency Room - <$100K	257	46,300	41	17
Emergency Room - $100-300K	90	79,000	0	40
Emergency Room - >$300K	3	44,700	100	0

[a]Percentages may not add to 100% because not all compensation arrangements are included.

[b]"K" represents $1,000

The accompanying text is an integral part of this table.

C. CONCLUSIONS

The major findings for the cardiology and emergency room specialties are the following:

- The two specialty departments contribute approximately 6 percent to the total gross charges and approximately 5 percent to the total fully-allocated costs of their hospitals.

- Total HBP remuneration represents a significant portion of the total direct costs in these departments (approximately 65 percent in cardiology and 49 percent in the emergency room).

- The average FTE compensation amounts for cardiologists and emergency room physicians in the sample are considerably lower than those found earlier for radiology, pathology and anesthesiology. The average for cardiology is $63,000; the average for emergency room is $54,700.

- As with the other specialties, the type of compensation arrangement appears to be closely associated with the amount of compensation--the percentage arrangements are associated with higher average FTE compensation amounts (e.g., $74,900 for emergency room HBPs) than are the salary arrangements (e.g., $40,400 for emergency room HBPs).

- The findings relating amount and type of compensation to hospital characteristics such as teaching status, bed size and SMSA location did not reveal any significant differences. There is a slight tendency for FTE compensation amounts to be higher in nonteaching rather than in teaching institutions. In contrast to the findings for the other specialties, FTE compensation amounts were, on the average, lowest in small hospitals. Little difference was found in average FTE compensation amounts between SMSA and non-SMSA locations, although the sample sizes in the non-SMSA areas were quite small.

- Average FTE compensation amounts vary by region, with generally higher averages in the West (e.g., $67,100 for emergency room HBPs) and North Central regions, and lower ones in the South and Northeast (e.g., $38,300 for emergency room HBPs). These differences

in general coincide with the distribution of the HBPs in the sample in teaching institutions. That is, those regions in which a greater proportion of the HBPs in the sample are in teaching institutions are also the regions in which average FTE compensation amounts tend to be lower.

- With regard to cost reimbursement and prospective rate setting, the data indicate an association between high levels of cost reimbursement and the absence of prospective rate setting on the one hand, and higher average FTE compensation amounts on the other hand. However, as noted in the text, these differences in averages can be due to many other factors in addition to cost reimbursement and prospective rate setting.

- Finally, as is the case with the specialties examined previously, the FTE compensation amounts of the HBPs are positively associated with the revenues per FTE of their departments. As these FTE revenues increase, so do the FTE compensation amounts of the HBPs.

HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

MULTIVARIATE ANALYSIS OF RADIOLOGY, PATHOLOGY, CARDIOLOGY, AND EMERGENCY ROOM

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STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

MULTIVARIATE ANALYSIS OF RADIOLOGY, PATHOLOGY, CARDIOLOGY, AND EMERGENCY ROOM

A. INTRODUCTION

The objective of this part of the study of hospital-based physicians (HBPs) is to gain a better understanding of the factors affecting the amount of compensation received by HBPs by means of an exploratory multivariate analysis. Of particular interest is the role played by the type or method of compensation arrangement between the HBP and the hospital. The specialties included in this analysis are radiology, pathology, cardiology, and emergency room, with emphasis on radiology and pathology. The fifth specialty covered in the earlier descriptive segments of this study, anesthesiology, was eliminated from additional analysis due to the large percentage of direct billers (HBPs that do their own billing) in this specialty. The number of anesthesiologists for whom we had adequate remuneration data produced a sample size that was too small for multivariate analysis.

The multivariate analysis is built on the results of the descriptive analysis in Segments II and III. To repeat some of those findings, particularly as they pertain to pathologists and radiologists, higher amounts of compensation per full-time equivalent (FTE) HBP are associated with the following contract, hospital, and geographic characteristics:

- A percentage type of compensation arrangement, particularly in contrast to a salary arrangement.

- A nonteaching rather than a teaching hospital.
- A small (under 100 beds) or medium-sized (100 to 300 beds) hospital, rather than a large one (the highest compensation amounts for radiologists were found in small hospitals; the highest for pathologists, in medium-sized hospitals).
- A location in the West region of the country, especially in comparison to the Northeast region.
- A location that is not in a standard metropolitan statistical area (SMSA).
- A hospital with over 50% of its revenues from cost reimbursement sources.
- A hospital which is not under any prospective rate setting arrangement (this was a weak finding).

The preceding profile is only descriptive, it emerges from tabular comparison of pairs of variables. The multivariate analysis is intended to refine and extend the descriptive analysis. Our design for the analysis was submitted to HCFA and an advisory panel for review, and the resulting approach draws on all these sources. The next section describes the basic concepts and presents some overview empirical results for all four specialties. Subsequently, we develop and estimate a more elaborate model for a subgroup of pathology and radiology departments.

The remainder of this segment is, of necessity, technically more complex than other segments in this report. The reader who is primarily interested in the major findings and conclusions of this effort is referred to the last section of this segment, beginning on page IV-52.

MULTIVARIATE ANALYSIS OF RADIOLOGY, PATHOLOGY, CARDIOLOGY, AND EMERGENCY ROOM

B. BASIC CONCEPTS AND OVERVIEW REGRESSION RESULTS

Ideally, we would be able to specify and estimate a model which would include:

- A demand function indicating the derived demand for the services provided by HBPs.
- A production function for HBP services which would relate HBP, other labor, and capital inputs to departmental outputs.
- An HBP income or utility maximization function which would relate quantities produced and the input mix to the type of contractual arrangement, input prices, the derived demand for HBP department services, and production possibilities (from the production function).

Together, these three relationships would indicate the most important factors in determining HBP compensation amounts. Of particular interest would be the role played by the type of arrangement and the extent to which the input mix was itself influenced by the type of contractual arrangement.

Unfortunately, no reliable data are available on outputs, prices, and inputs. Hence, the information available to us deals with hospital and area characteristics, the type of HBP contractual relationship, and the amount of HBP compensation. Our multivariate analysis attempts, within these constraints, to identify factors important in the determination of HBP compensation, with particular attention to the role played by the type of contractual arrangement.

The first step in the analysis was to define conceptually those factors which we hypothesized to affect the amount of HBP compensation.

Conceptual Variables

The primary dependent variable in the multivariate analysis is the average amount of compensation per FTE HBP in a hospital department. We postulate this variable to be affected by the following factors:

- The type of compensation arrangement between the hospital and the HBP or HBP group. Our major interest is in distinguishing between the salary and the percentage types of contractual arrangement. As discussed in earlier reports, the percentage arrangement is hypothesized to create incentives and opportunity for HBPs to achieve higher incomes than does the salary arrangement. We presume that even if labor market conditions are such that the HBP could attain a high income under a salary arrangement, the increased flexibility for increasing his income under a percentage arrangement, and perhaps the lower visibility of the total compensation amount, will make that arrangement the more attractive one to the HBP.

  We should also note that our compensation data for salaried HBPs normally represents net income, while compensation for those on a percentage arrangement usually represents gross income, from which the HBP must usually pay his fringe benefits and malpractice insurance, and occasionally some operating expenses. A more detailed explanation of this difference is presented on pages II-19 through II-20. The importance of this will be examined when we present regression results.

- Complementary inputs--By this we mean the amount of additional capital and labor inputs available to each FTE HBP. We hypothesize that the greater the amount of such complementary inputs, the greater will be the returns to the HBP under any compensation arrangement but especially under the percentage arrangement.

- Labor market conditions and bargaining position--We utilize several variables to measure these forces, as described below. Our hypothesis is

that the better the HBP's labor market position, the greater the amount of his compensation, other things equal. At the same time, the less incentive the hospital has to bargain aggressively with the HBP, the greater we expect the amount of HBP compensation to be.

. Type of hospital--In this category, we include institutional factors such as the size of the hospital and whether or not it is a teaching hospital. Some of these variables also reflect the labor market and bargaining conditions just described, but they also absorb the influence of additional factors, such as tradition and differences in practice patterns.

. Hospital location--To the extent that practice patterns vary in different regions of the country, the amount of compensation received by HBPs may vary across regions even if all other factors are the same. Similarly, practice pattern differences may exist between urban and rural settings (such differences also generally reflect a difference in labor market conditions). Also, general price levels vary across regions, and different compensation amounts may actually represent similar levels of real earnings to the HBPs. For these reasons, we include some variables to measure differences in the location of the hospitals in our sample.

Empirical Measures

The major empirical variables we used in our analysis, and their relationship to the conceptual factors discussed in the preceding section, are listed and discussed below. The abbreviations in the left margin are those which will be used in our discussion of the results.

IREMUN — Average amount of compensation per FTE HBP for the department. Note that for departments with more than one HBP the amount of compensation reported is the departmental average per FTE and may not be the same as the compensation of any individual HBP.*

*Generally, three-fourths or more of the departments in each specialty studied involve more than one HBP.

Also, because IREMUN is measured at the department level, the samples used in the regressions are samples of departments.*

In addition, as noted earlier, this variable indicates gross income for those under percentage arrangements and net income for those on salary. Although we do not have data for the entire sample on the additional expenses paid by those on percentage arrangements, we have some pertinent information from the New York study (see Segment V) and the contract analysis (see Segment II, Section E), which we draw on in the presentation of the regression results.

SAL — This is a categorical or dummy variable, with a value of 1 if the department's HBPs are compensated only on a salary basis, and a value of 0 otherwise.

PER — This is also a dummy variable, with a value of 1 if the department's HBPs are compensated only on a percentage basis, and a value of 0 otherwise. Percentage of net and percentage of gross arrangements are combined in this category, since the two generally differ only in that deductions in departmental revenue are made under percentage of net arrangements for such items as bad debts and contractual allowances. Therefore, the incentives presumed to operate on HBPs are quite similar under both types of percentage arrangement; hence, we combined them.

COMB — This is a dummy variable representing combination compensation arrangements, usually involving a base (a "salary") plus a percentage of gross or net departmental revenues.

OTHER — This is the excluded dummy variable for type of compensation arrangement; it includes all types of compensation other than the three just described. Examples are management fee and relative value scale arrangements.

*We had a choice of using the department or the contract as the unit of observation; however, the contract level data were available only for radiology and pathology. Our preliminary work yielded similar results using either unit; hence, to attain consistency among all four specialties, we used the department level data for the results presented in this report.

CSTAFTEX Complementary inputs--The best measure we have for complementary capital and labor inputs is the item in the Medicare cost reports indicating the departmental cost after the stepdown procedure, but excluding any HBP compensation normally included in that cost measure. We assume that most capital and labor decisions are made prior to the year for which we have data; hence, we can treat this as a predetermined rather than a pure endogenous variable. The cost after stepdown is then translated to a per FTE HBP basis. The result appears to be a reasonable, although rough, estimate of non-HBP capital and labor inputs into the departmental production process, but it unfortunately does not measure the possible additional inputs of interns and residents in the department.*

The following group of variables is intended to measure the labor market conditions and bargaining position factors discussed earlier in the text.

DOCTOBED Ratio of physicians to hospital beds in the county (measured as physicians per 1,000 beds). This is the ratio of all general patient care physicians in the county to the number of hospital beds in the county.

It is intended as a rough indicator of the availability of physicians to the hospital. (Obviously, county boundaries need not coincide with market area boundaries). We hypothesize that the higher the physician-to-bed ratio, the greater the competition the HBP must face and the more likely that his compensation will be lower than otherwise. (This variable could also have the opposite effect if a large supply of physicians leads to a large demand for HBP services. This would tend to increase the compensation of the HBPs.)

A variable measuring the number of HBPs per bed for the specialties in question would be a better measure of competition than the overall physician-to-bed ratio. However, we only had such data

*We also experimented with the use of a variable measuring only the non-HBP salary expense in the department as a measure of the complementary inputs (at least, the labor portion). The results for both variables were quite similar, so we used the more comprehensive CSTAFTEX variable for the results presented here.

available for radiologists and pathologists and only for SMSAs. Therefore, we used the overall ratio between the specialties under study. The use of this variable also assumes a relatively constant ratio between the specialties under study and the number of general patient care physicians, so that a high DOCTOBED ratio also indicates, say, a high ratio of radiologists per bed. We were able to test this assumption because, for radiologists and pathologists in SMSAs, we had available the ratio of those specialists to beds in the SMSA. In preliminary regressions for these two specialties, we experimented with this variable, indicating by a zero the non-SMSAs (to indicate, as an approximation, a very low ratio of specialtists to beds). This variable behaved in roughly the same way as the DOCTOBED variable, so we continued to use DOCTOBED in our general regressions.

COSTREIM — The percent of hospital revenues obtained from third-party cost reimbursers (measured in percentage points--i.e., 12.2% is entered as 12.2). To the extent that HBP compensation is a recoverable cost from the point of view of the hospital under cost reimbursement, we hypothesize this variable to be positively related to the amount of compensation.

PROSP — The percentage of hospital revenues under a formalized prospective rate setting system (also measured in percentage points). If such forces are effective, we expect that the greater this percentage, the lower the HBP compensation amount.

Additional indicators of labor market conditions and bargaining strength, such as the hospital's size and whether or not it is a teaching institution, have been categorized under other headings, and they are therefore presented later. Nevertheless, it should be kept in mind that they also serve as indicators of labor market conditions and bargaining strength.

The following group of variables indicates the type of hospital and its location.

NOBEDS — Number of beds in the hospital. We hypothesize that as size increases, compensation per FTE HBP will decrease. This is due to the close relationship of size to both teaching status and to urban-rural location (as was noted in earlier segments), and the expectation that large hospitals are in a better position to bargain with HBPs than are small ones.*

TEACHING — Teaching status (measured using a categorical 0, 1 variable). This variable includes the effects of (a) interns and residents ordering more tests than normally required, (b) more complex cases, which require additional HBP services, and (c) the fact that HBPs may be willing to trade some compensation for the prestige of being affiliated with a teaching hospital. If factor (c) outweighs the other two, then this variable will be negatively associated with the amount of compensation.

PROFIT — Profit status of hospital (a 0, 1 variable). Our hypothesis is that for-profit hospitals will attempt to bargain aggressively with HBPs and thereby attempt to limit their compensation, although labor market conditions will affect the success of such efforts.

Here, too, as for DOCTOBED, the variable could act in the opposite direction. For instance, since ancillary departments are usually profitable, the for-profit hospital would presumably be motivated to encourage the services provided in these departments. For-profit hospitals may thus be willing to pay HBPs a premium (and perhaps to favor a percentage arrangement) in order to attract and retain HBPs which will aggressively attempt to expand the services provided by their departments. Thus, the direction of this variable's impact is unclear *a priori*.

REGION:
NEREG
NCREG
SREG

These are categorical, 0, 1 variables used to indicate the four regions of the county. (The Northeast, North Central, and South are listed in the margin; the West is the excluded variable.) The primary purpose of these variables is to reflect regional differences in practice patterns and cost of living.

*We also experimented with the three size categories (small, medium, and large, as defined in earlier segments) as variables, but NOBEDS proved to be superior.

PERCAP — County per capital income (measured in thousands--i.e., $3,270 is recorded as 3.27). This variable is used as a proxy measure of cost of living and wage differences as well as a rough indicator of consumer demand. We therefore hypothesize that this variable will be positively related to amount of HBP compensation.

We also examined the use of a dummary variable to indicate whether or not the hospital was located in an SMSA. This variable was intended as an urban-rural indicator, but was insignificant in all preliminary regressions. Since nearly 90% of the departments in our sample are in SMSAs, and since the SMSAs vary considerably among themselves, this variable is not a very good discriminator between urban and rural locations. Also, other variables already included seem to measure more directly the differences we had hypothesized the SMSA variable to absorb; these are the variables measuring per capita income, region, physician-to-bed ratios, teaching status, and hospital size. Hence, the SMSA variable was not included in the regression results presented here.

Overview of Regression Results

To obtain an overview of the relationships between the variables just listed and the amount of compensation per FTE HBP, we estimated linear regression equations for amount of compensation for each of the four specialties under study: radiology, pathology, cardiology, and emergency room. These regressions help us to identify the role played by the type of compensation arrangement, and also indicate the nature and degree of multicollinearity involved among the other variables.

As noted earlier, we use the department as the major unit of observation. The number of departments in each specialty's sample are:*

- Radiology - 98
- Pathology - 95
- Cardiology - 89
- Emergency Room - 50

The distribution of these departments by compensation arrangement is shown in the table below.

As noted in Segment III, a substantial portion of cardiologists in our sample were compensated under fee-for-service and related arrangements; relatively few were on either a salary or a percentage arrangement. This fact is reflected in the following table on compensation arrangements, and also effects the subsequent regression results.

DISTRIBUTION OF DEPARTMENTS
BY SPECIALTY AND ARRANGEMENT

Specialty	Compensation Arrangements			
	Salary	Percentage	Combination	Other
Radiology	16	58	4	20
Pathology	23	45	4	23
Cardiology	12	12	0	65
Emergency Room	17	12	2	19

The results for the regressions for each specialty, with the amount of compensation per FTE HBP as the dependent variable, are presented in Table B-1.

*These samples were restricted to only those departments in which all HBPs were under the same type of compensation arrangement--e.g., all under salary, all under percentage, etc.

TABLE B-1

OVERVIEW REGRESSIONS--FOUR SPECIALTIES, ALL DEPARTMENTS

	Radiology	Pathology	Cardiology	Emergency Room
Sample size	98	95	89	50
R^2	.60	.25	.29	.40
Coefficients and t-values(a)				
Salary arrangement(b)	-$ 66,400 (-3.32)	-$ 59,200 (-2.55)	-$33,900 (-1.61)	-$19,700 (-1.67)
Percentage arrangement(b)	$ 9,400 (.72)	$ 14,500 (.72)	$35,100 (1.78)	-$ 1,900 (- .17)
Combination arrangement(b)	-$ 50,600 (-1.74)	-$ 35,600 (- .87)	-	$22,600 (.94)
Cost after stepdown per FTE HBP	.236 (8.60)	.046 (1.96)	.069 (3.50)	- .006 (- .22)
Cost reimbursement percentage	- 603 (-1.16)	- 770 (-1.22)	- 213 (- .39)	- 416 (-1.06)
Prospective reimbursement	- 240 (- .54)	- 52 (- .08)	- 31 (- .05)	- 537 (-1.12)
For-profit hospital(b)	-$ 21,800 (-1.16)	-$ 28,500 (- .91)	$56,000 (2.08)	$40,400 (2.77)
Teaching hospital(b)	$ 9,500 (.60)	-$ 9,800 (- .51)	$13,600 (.78)	$ 1,400 (.11)
Number of beds	- 62.8 (-1.70)	- 46.6 (- .96)	- 51.1 (-1.11)	8.1 (.22)
County per capita income	442 (.04)	6,431 (.38)	22,600 (1.58)	13,400 (1.28)
County physician-to-bed ratio	- 4.52 (- .10)	- 43.3 (- .83)	- 47.8 (-1.12)	30.1 (.77)
Regions--Northeast(b)	-$ 14,800 (- .68)	-$ 25,000 (- .90)	-$ 8,100 (- .34)	$13,700 (.79)
--North Central(b)	$ 1,600 (.08)	$ 12,600 (.47)	$ 8,000 (.35)	$ 6,400 (.38)
--South(b)	-$ 16,500 (- .88)	-$ 200 (- .01)	$17,700 (.78)	$ 1,500 (.12)
Constant term(b)	$125,600 (2.06)	$143,700 (1.96)	$39,100 (.61)	$20,600 (.52)

(a) T-values in ( ).
(b) Coefficients to nearest $100.

The regression results are generally similar across the four specialties. The proportion of the variance in the dependent variable which is accounted for by these regression equations varies from a low of 25% for pathology to a high of 60% for radiology. The most important findings from these regressions are the following:

1. The percentage arrangement, combination arrangement, and the excluded "other" arrangement do not appear to be statistically significant in terms of their impact on amount of compensation (where we define significance as a t-value greater than or equal to 1.96 in absolute value).

2. As expected, even after controlling for other factors, the salary arrangement results in significantly lower compensation amounts than does the percentage arrangement in three of the four specialties. For radiology and pathology, the absolute t-values are in excess of the 1.96 definition of significance. For cardiology, the differential between the t-value for salary (-1.61) and that of the percentage arrangement (1.78) was considered substantial enough (3.39) that despite the lack of significance individually, when related to each other, the difference was significant. The exception is the emergency room, where the difference appears to be in the same direction but is not statistically significant at the 5% level.

3. The cost after stepdown variable, serving as our proxy for complementary inputs, has a significant positive coefficient for all specialties except emergency room, where the coefficient is insignificantly different from zero.

4. The only other variable with a significant coefficient is the variable indicating a for-profit hospital. The coefficient of this variable is significant and positive in the regressions for cardiology and emergency room. It is unclear why for-profit hospitals would pay a premium for these two specialties and not for the other two.

What can we infer from these results? First, we have reinforcement for the finding in the descriptive analysis that

salary arrangements are associated with lower amounts of compensation than are other, and particularly percentage, arrangements. This difference persists in the regression equations even after controlling for a considerable number of other variables thought to also affect the amount of compensation. The resulting coefficients for radiology and pathology further suggest that, at least for these two specialties, the difference between salary and percentage arrangements is due to more than the amount attributable to the expenses and fringe benefits which those under a percentage arrangement must pay out of their gross earnings. Our contract analysis (see Segment II) and the New York study (see Segment V) indicated that most HBPs under percentage arrangements had to provide their own fringe benefits, but generally did not have to pay many operating expenses (such as personnel and equipment costs). We also found that the cost of malpractice insurance in radiology (with the exception of radiation therapy) and pathology was generally relatively low, often under $1,000 per year in New York, for example. This suggests that the fringe benefit package which the HBP under a percentage arrangement must provide will be considerable less than the $60,000 difference between the percentage and salary arrangements implied by the coefficients of the salary variables in the radiology and pathology equations. (A similar difference exists between the salary and the percentage arrangements for cardiologists, since the salary arrangement has a negative coefficient of $33,900, while the percentage arrangement has a positive coefficient of $35,000, resulting in a total difference between the two arrangements of $69,000.)

The second major finding of these regressions is the importance of the cost after stepdown variable. This result is not unexpected, however. To the extent that the amount of HBP compensation is related to overall department revenues, which are in turn related to department costs, the cost variable should be positively associated with the compensation variable. This association applies to three of the four specialties studied. Nevertheless, the regression results are consistent with the hypothesis that the greater the amount of other inputs the HBP has to work with, the greater his compensation. The relationship between this cost after stepdown variable and the other variables included in these equations will be explored in more detail later.

The third major finding from these overview regressions is that many of the other variables we have included in the regressions appear to be highly correlated with one another. Our analysis of the correlation matrices for the four specialties revealed that the most closely correlated pairs of variables were the following:

- Teaching with the salary arrangement and with the number of beds.
- The salary arrangement and the number of beds.
- The physician-to-bed ratio and per capita income.
- The prospective reimbursement percentage with the cost reimbursement percentage and with the Northeast region.

The following table shows the correlation coefficients for these pairs of variables for the four specialties.

TABLE B-2

CORRELATION COEFFICIENTS

Variables	Radiology	Pathology	Cardiology	Emergency Room
TEACHING - SAL	.50	.38	.36	.14
TEACHING - NOBEDS	.63	.50	.58	.54
SAL - NOBEDS	.57	.38	.40	.01
DOCTOBED - PERCAP	.65	.46	.49	.45
PROSP - COSTREIM	-.62	-.52	-.51	-.37
PROSP - NEREG	.56	.51	.49	.33

As the table indicates, the correlations are strongest for the radiology departments and weakest for the emergency room departments. The correlation between teaching and number of beds persists throughout all four specialties, as does the correlation between physician-to-bed ratio and per capita income. The correlation between prospective rate setting and cost reimbursement and the Northeast region applies to all specialties but the emergency room. Finally, the correlation between teaching and the salary arrangement and between the salary arrangement and number of beds is most pronounced in radiology and is virtually nonexistent in the emergency room departments.

In the regressions to be presented later, we tested the importance of these correlations by excluding some of the more highly correlated variables from the regression equations.

The fourth major finding is the relatively low R^2 value for three of the four specialties. These low values clearly suggest that further research is necessary, beyond this exploratory study, in order to more fully understand factors which effect the levels of compensation in the various HBP specialties.

Rationale for the Subsequent Analysis

Thus far, we have examined, both conceptually and empirically, those factors which appear to affect the determination of the amount of compensation obtained by HBPs in the four specialties of radiology, pathology, cardiology, and emergency room. Even after controlling for a considerable number of other factors, the difference between the salary arrangement and the percentage arrangement remains and appears to be greater than could be accounted for simply by the difference between gross and net incomes. In the next section of this segment, we explore these relationships further for radiologists and pathologists. These were the specialties which revealed the greatest differences in amounts of compensation according to type of compensation in the descriptive analysis. Also, when we restrict our samples to only those departments with either salary or percentage arrangements (i.e., we eliminate the departments with combination or "other" arrangements), then the samples for cardiology and emergency room become too small for any meaningful regression analysis (the sample would include 24 departments for cardiology and 29 for emergency room). Hence, in the next section of the report, we take a closer look at the importance of salary and percentage arrangements in the determination of amount of compensation in the radiology and pathology departments.

MULTIVARIATE ANALYSIS OF RADIOLOGY, PATHOLOGY, CARDIOLOGY, AND EMERGENCY ROOM

C. FURTHER ANALYSIS OF RADIOLOGY AND PATHOLOGY

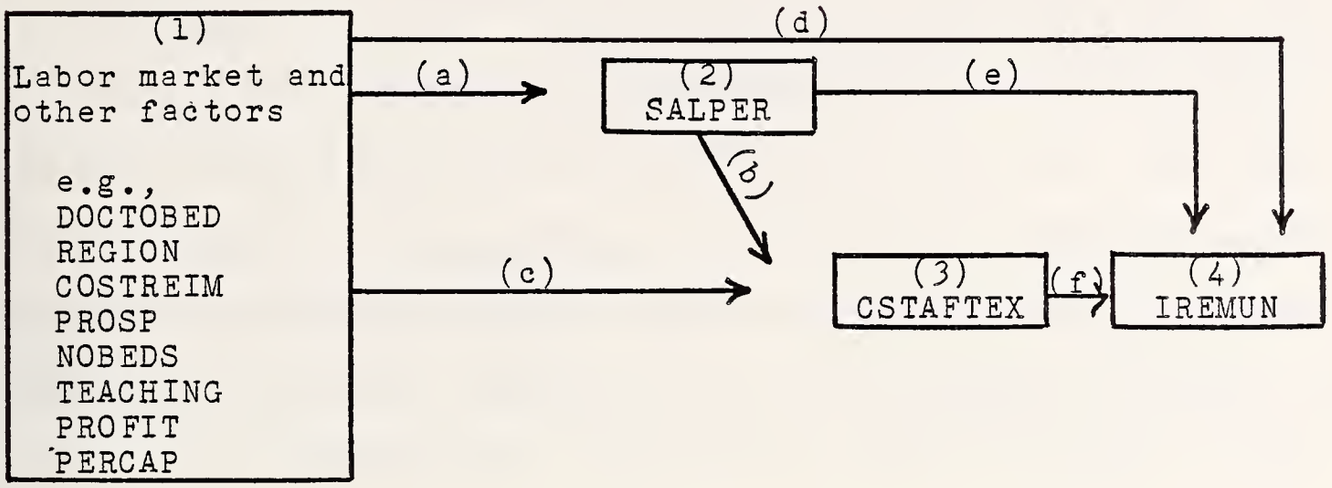
The overview results suggest that the type of compensation arrangement and our measure of complementary inputs (i.e., cost after stepdown) are the critical variables associated with the amount of HBP compensation, and that once these variables are included in a regression equation, the variables indicating hospital and area characteristics are generally not statistically significant. However, the type of compensation arrangement and the complementary inputs may, themselves, be determined by the labor market and practice pattern factors we measure through the use of the hospital and area variables, and we explore this topic for the specialties of radiology and pathology in this section.

To focus on the differences between the two major compensation arrangements, we restrict our samples to only those departments with either all salary or all percentage arrangements. Thus, we exclude the departments with arrangements in either the combination or the "other" categories. This leaves 74 radiology departments and 68 pathology departments in our samples.

The variable indicating the type of arrangement is now denoted SALPER. It is a dichotomous variable, with a value of 1 for a percentage arrangement and a value of 0 for salary arrangement.

The Model

The model we test in this section can be shown schematically as follows:



This is, in essence, a recursive model. First, we postulate that type of compensation arrangement (SALPER) is determined by institutional and labor market conditions (line(a) in the chart). Our earlier contract analysis and New York study showed the arrangements to be typically of multi-year duration. Hence, we assume SALPER to be a predetermined endogenous variable in our system.*

*We recognize that lagged values would be more appropriate for some of the exogenous variables. In fact, some of the data we utilize do pertain to the early 1970's, and are therefore lagged. Unfortunately, we could not readily obtain data on all the variables for the most desirable time period. However, we do not believe this greatly affects our results, since most of the variables measure conditions which have been in effect for some time and which change only slowly, especially relative to one another in a cross-section analysis (e.g., a hospital's teaching status).

In the determination of SALPER, we hypothesize that the percentage arrangement will generally be favored by HBPs in situations where their bargaining strength is great, since the percentage arrangement appears to offer greater control to the HBPs over their earnings possibilities. Thus, we expect the type of compensation arrangement to be influenced by labor market conditions and bargaining position, and by the type and location of the hospital. For instance, a large, urban teaching hospital in an area with many physicians may be in a position to insist on a salary arrangement with an HBP, whereas a small, rural hospital may be forced to accept a percentage arrangement.

In theory, then, the factors affecting the type of compensation appear to be many of the same ones which we included in our overview regressions as affecting the amount of compensation.

The next relationship we postulate is that <u>complementary inputs</u> (CSTAFTEX) are determined by a similar set of exogenous variables (line(c)) plus the contractual arrangement assumed to have been worked out earlier (line(b)).* We hypothesize that the type of contractual arrangement will affect the complementary inputs, with a stronger incentive for the HBP under a percentage arrangement to increase the relative amount of complementary inputs per FTE HBP. Then, we include other variables in this equation to control for other factors which influence complementary inputs in addition to the type of compensation arrangement. These are

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*The specific exogenous variables included in each equation are spelled out in the sections presenting regression results.

variables which indicate differences in the size of the hospital, its complexity, and its location. These factors are included because we expect differences in practice patterns and price levels across regions and between urban and rural areas, and also because we expect that the larger more complex and teaching hospitals will require greater amounts of complementary inputs per HBP regardless of the type of contractual arrangement.

Finally, we hypothesize that both the type of arrangement and the complementary inputs affect the amount of compensation (IREMUN), along with yet another set of exogenous variables (lines (d), (e), and (f)).

We thus postulate a <u>recursive</u> system, which can be represented as follows:

$$\text{SALPER} = f_1 \text{ (a set of exogenous variables)}$$
$$\text{CSTAFTEX} = f_2 \text{ (SALPER, another set of exogenous variables)}$$
$$\text{IREMUN} = f_3 \text{ (CSTAFTEX, SALPER, third set of exogenous variables)}$$

Assuming that the contemporaneous disturbances of these relations are not correlated, we can obtain unbiased estimates of all coefficients by applying ordinary least squares to each equation. Problems in determining statistical significance will arise, however. For example, in the SALPER equation, the use of a dichotomous dependent variable results in heteroskedasticity (i.e., the disturbances in the regression are not distributed with a constant variance). Also, in all equations, multicollinearity may be a problem, as we already noted in the overview regressions. Adding to the potential collinearity problem is the fact that in a recursive system, the

dependent variable in one equation (e.g., SALPER) is included as an independent variable in another equation along with some of the same exogenous variables used in its own determination.

To address both the conceptual and statistical issues of this study, we tested alternative versions of the model, as can be shown with reference to the earlier chart. First, we tested the basic model as just outlined:

1. That SALPER is determined largely by factors such as in box (1)--i.e., that the relationship implied by line (a) holds.

2. That CSTAFTEX is determined largely by SALPER and factors such as in box (1)--i.e., that both line (b) and (c) are valid.

3. That IREMUN is determined largely by factors such as in box (1), plus SALPER and CSTAFTEX--i.e., lines (d), (e), and (f).

We also examined the following alternatives:

4. That CSTAFTEX is not influenced by SALPER but only by factors in box (1)--i.e., that line (b) does not hold.

5. That IREMUN can be linked to factors in box (1) when SALPER and CSTAFTEX are excluded--i.e., that line (d) alone holds.

6. That IREMUN is primarily associated with SALPER and CSTAFTEX (lines (e) and (f)), and only indirectly, through the relationships implied by lines (a) and (c), to factors in box (1).

Our findings are reported in the following sections.*

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*We also considered the use of a simultaneous equation model, as opposed to this recursive system. This would be appropriate if we assumed the disturbances in the CSTAFTEX and IREMUN equations to be correlated. A two-stage-least-squares approach would then be appropriate. We chose to use a recursive system for this exploratory study because it seemed conceptually reasonable as well as less costly from a data processing point of view. However, we believe that a logical refinement in a future study of this type would be to explore the simultaneous equation approach.

Results for Radiology

Our approach was to estimate linear regression equations for each specialty separately. The linear form appeared to be the most appropriate for this exploratory analysis, and we developed separate equations for each specialty in order to test the hypothesis that the underlying structure of our model might be different for each specialty.

We will first discuss, for radiology, the results for the type of compensation arrangement (SALPER) regressions. Then, we will present the results for the complementary inputs equations (CSTAFTEX). Finally, we will discuss the results for amount of compensation (IREMUN). The results for pathology are reported in the next section.

Results for Type of Compensation Arrangement

As discussed earlier, we assumed that many of the factors we earlier included in regressions for amount of compensation were also relevant for the determination of type of compensation arrangement. Thus, we included the following variables:

DOCTOBED — Using this as an indicator of labor market conditions, and assuming that HBPs would have a preference for the percentage arrangement if their bargaining position was strong, we hypothesized this variable to be negatively related to the dependent variable, SALPER (where a value of 1 for SALPER indicates the percentage arrangement).

PROFIT — This variable could go either way. On the one hand, it might be positively associated with the dependent variable if for-profit hospitals are willing to enter into percentage arrangements with HBPs in order to encourage the production of ancillary services. On the other hand, the coefficient may be negative if

such hospitals desire and are able to put HBPs on a salary arrangement in order to better predict and possibly even control costs.

REGIONS — We included these variables in order to reflect possible differences by regions in terms of type of contractual arrangement. For instance, our preliminary work indicated that salary arrangements were highly prevalent in the Northeast, while percentage arrangements were prevalent in the West.

NOBEDS — Our assumption here was that larger hospitals would be in a better bargaining position relative to HBPs; therefore, we hypothesized a negative coefficient for this variable.

TEACHING — As for NOBEDS, we hypothesized a negative coefficient for this variable, since we presume the prestige of a teaching hospital puts that hospital in a stronger bargaining position relative to the HBP in terms of type of compensation arrangement. Also, perhaps because of this, salary arrangements are traditionally associated with teaching hospitals. We should also note that in our sample, teaching hospitals were also the large hospitals; hence, the correlation between this and the preceding variable is high.

COSTREIM — We hypothesize this variable to have a positive coefficient, under the assumption that a high degree of cost reimbursement will make the hospital less reluctant to enter into a percentage arrangement with the HBP, since costs are largely passed on to third-party payors.

PROSP — If prospective rate setting is effective, we postulate that it may have a negative effect on the type of arrangement. That is, it may lead more hospitals to attempt to put HBPs under a salary arrangement.* In our sample, most of the hospitals located in prospective rate setting states were also in the Northeast region; hence, we have a fairly high degree of collinearity between this and the region variables.

We also included other variables, such as the hospital occupancy rate and per capita income, in alternative formulations of

*Another possibility explored in more detail in our New York study (see Segment V), is that a tough prospective rate setting program will cause a shift of HBPs to an independent contractor (i.e., direct billing) status.

this relationship, but these variables were totally insignificant. Hence, in the interest of keeping this segment of reasonable lenth, we have chosen not to report such results.

To test for the possible multicollinearity noted in the above description, we estimated this regression both including and excluding variables indicating teaching status and prospective rate setting. Our results are shown in Table C-1.

TABLE C-1

RADIOLOGY REGRESSIONS

Dependent Variable: SALPER

TEACHING AND PROSP	Excluded		Included	
	Coefficient	t-value	Coefficient	t-value
DOCTOBED	- .00045	-1.70	- .00030	-1.07
PROFIT	- .061	- .46	- .091	- .69
REGIONS--Northeast	- .286	-2.08	- .144	- .89
--South	- .151	-1.29	- .351	- .26
--North Central	- .367	-2.70	- .303	-2.16
NOBEDS	- .00091	-4.40	- .00065	-2.53
TEACHING	-	-	- .202	-1.57
COSTREIM	- .0043	-1.24	- .0036	- .91
PROSP	-	-	- .0019	- .58
CONSTANT	1.69	6.11	1.34	3.55
R^2	.48		.50	

The regressions indicate that about half of the variance in the dependent variable is accounted for by the included exogenous variables. As expected, when the teaching variable is included the t-value of the variables for number of beds drops considerably. The entry of the prospective rate setting variable appears to have the same effect on the variable for the Northeast region. Thus, we can treat the variable for Northeast region as measuring the same forces as does the prospective rate setting variable, and we

can regard the NOBEDS variable as indicating the same factors as does the teaching variable. The correlation between the Northeast variable and the prospective rate setting variable is .53, while the correlation coefficient between NOBEDS and TEACHING is .72. Even though the prospective rate setting variable is negatively correlated with the cost reimbursement variable (correlation coefficient of -.57), the entry of the prospective rate setting variable does not greatly reduce the t-value of the cost reimbursement variable, and COSTREIM is statistically insignificant in both cases.

The usual impact of heteroskedasticity resulting from the use of a dichotomous dependent variable is that the regression coefficients are still unbiased estimates, but the t-values of the estimated coefficients tend to be biased toward zero. This suggests that the computed t-values can be regarded as indicating a higher level of significance than in conventional regression results.

With this understanding regarding t-values in mind, we find that regional location has a very definite impact on type of compensation arrangement, with a marked tendency toward salary arrangements in the Northeast and North Central regions, and somewhat of a tendency in that direction in the South region (where the excluded variable is the West region). Large hospitals and teaching hospitals (the two are closely associated in our sample) also create a strong tendency toward salary arrangements. A high physician-to-bed ratio appears to increase the tendency toward salary arrangements, although this coefficient drops considerably

in significance when the teaching and prospective rate setting variables are included. Whether a hospital is for-profit or not-for-profit does not appear to have any bearing on the type of arrangement in these equations, nor does the cost reimbursement percentage.

Thus, these results are generally consistent with our expectations and generally conform to the results of our earlier descriptive analysis.

Results for Complementary Inputs

Our measure for complementary inputs is the cost after stepdown per FTE HBP, but excluding any compensation paid to the HBP. This dependent variable is denoted CSTAFTEX. Our main interest in this equation was to see whether or not the type of compensation arrangement appeared to be related to the cost after stepdown. The rationale for this was that we assumed that those HBPs under a percentage arrangement would generally benefit from an increase in departmental costs (since most of the percentage arrangements are based on the gross or net revenues of the department and not on the net income of the department). Thus, we hypothesized that the variable, SALPER, would have a positive coefficient in the regression equation with CSTAFTEX as the dependent variable.

In order to attempt to isolate the effect of SALPER, we included in this equation a number of additional variables which we hypothesized would affect the value of CSTAFTEX. We recognize that a complete determination of our cost after stepdown measure

would include such variables as those indicating the complexity of services provided, the number and condition of patients treated, and more direct output measures. However, as noted earlier, reliable data on such variables at the departmental level are not available. Thus, we hypothesized that the cost after stepdown could vary among hospitals in terms of the following hospital and geographic characteristics:

NOBEDS
TEACHING — We expect a higher cost after stepdown in the larger hospitals and in teaching hospitals. As before, we expect these two variables to be highly correlated.

PROFIT — We hypothesize that the for-profit hospitals, in an attempt to minimize their costs, would have a lower cost after stepdown than the not-for-profit hospitals.

OCCRATE — This variable measures the occupancy rate at the hospital, and is included to adjust for possible shifts of fixed costs to the ancillary departments when the occupancy rate is low. Hence, we expect a negative coefficient for this variable.

COSTREIM — We hypothesize that this variable would have a positive coefficient, using the same rationale as in the previous equation for type of compensation arrangement.

REGION
PERCAP — These variables are included to adjust for differences among regions and within regions in wage and price levels, since CSTAFTEX is measured in current dollars.

PROSP — We also included this variable, hypothesizing that a prospective rate setting system may hold costs down. As in the other equations, the correlation between this variable and the Northeast regional variable is high.

The variables we included in the CSTAFTEX equations are thus similar to those in the previous SALPER equation. The differences are that the CSTAFTEX equation does not include a variable for the physician-to-bed ratio (DOCTOBED), since it did not appear to be relevant to the determination of CSTAFTEX, and the CSTAFTEX equation includes a variable for occupancy rate (OCCRATE). Because of the

correlations mentioned above, we estimated these equations both including and excluding the variables TEACHING and PROSP. Illustrative results are shown in Table C-2.

TABLE C-2

RADIOLOGY REGRESSIONS

Dependent Variable: Complementary
Inputs = Cost After Stepdown (CSTAFTEX)

	Coefficient[a]	t-value
SALPER	42,700	.56
PROFIT	- 83,500	- .94
REGIONS--Northeast	- 62,300	- .80
--South	- 91,500	-1.17
--North Central	- 32,300	- .46
NOBEDS	363	2.53
COSTREIM	- 37.7	- .02
OCCRATE	- 188	- .85
PERCAP	106	.002
CONSTANT	203,200	.62
R^2	.17	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

The R^2 for these regression equations was always quite low; the highest value we obtained was .19. The coefficient of the variable indicating type of compensation arrangement (SALPER) was always statistically insignificant, with a t-value of .6 or less. The introduction of the variables TEACHING and PROSP had very little effect. The R^2 increased only slightly, the coefficients of the two variables were statistically insignificant, and the coefficients and t-values of the other variables were only slightly altered.

The only statistically significant variable in these equations was the variable for number of beds. This variable was

positively associated with cost after stepdown, as expected. Its significance was unaffected by the entry of the teaching variable. Because this variable was significant in the earlier equation using type of compensation arrangement (SALPER) as the dependent variable, we thought that the potential significance of the SALPER variable in the CSTAFTEX equation might have been affected by the inclusion of the NOBEDS variable in the same equation. Hence, we experimented by deleting the NOBEDS variable from the CSTAFTEX equation. This resulted in a reduction in the R^2 to .09 and had no effect on the significance of the coefficient for SALPER.

Therefore, for radiology, the explanatory power of our regression equation for CSTAFTEX is quite low, and the only statistically significant variable appears to be the number of beds in the hospital. The method of compensation arrangement appears to have no statistical bearing on our measure of complementary inputs. Thus, in terms of the model presented earlier, it appears we can treat CSTAFTEX more as an exogenous than an endogenous variable in the determination of IREMUN. (This also eliminates the possible need for a two-stage-least-squares approach.)

Results for Amount of Compensation

The results for the previous regression equations indicate that SALPER is related to several of the exogenous variables in our system, while CSTAFTEX is, at most, related only to the number of beds in the hospital. With this information as a basis, we first estimated a regression equation for amount of compensation including the box (1) exogenous variables but excluding the other two system variables of SALPER and CSTAFTEX (this is represented as line (d) in

the chart we presented earlier).* We then examined the explanatory power of using only SALPER and CSTAFTEX in a regression equation for amount of compensation arrangement. Finally, we estimated equations combining all of the variables.

Table C-3 presents the results for the regression including only the exogenous variables. The variables included are the same as those included in the overview regressions. We also experimented using various subsets of these variables--i.e., we deleted TEACHING, PROSP, PERCAP, and NOBEDS--but these variations did not significantly alter the results. Hence, Table C-3 can be regarded as representative of the regressions including only the exogenous variables.

Table C-3 shows that with only the exogenous variables included, the R^2 is .20 for radiology. Most of the variables are statistically insignificant. However, the North Central region and the PROFIT variables have negative coefficients which are relatively close to the conventional 5% level of significance. Nevertheless, our overall conslusion is that this set of variables has relatively low explanatory power in total and that few of the variables approach statistical significance.

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*The particular exogenous variables used are the same as in the overview regressions for all four specialties presented earlier.

TABLE C-3

RADIOLOGY REGRESSIONS

Dependent Variable: Amount of Compensation (IREMUN)

	Coefficient[a]	t-value
NOBEDS	- .78	- .01
TEACHING	- 28,600	-1.09
PROFIT	- 47,000	-1.73
COSTREIM	- 465	- .57
PROSP	- 63.1	- .94
REGIONS--Northeast	- 43,100	-1.30
--North Central	- 55,100	-1.90
--South	- 29,700	- .99
DOCTOBED	- 100	-1.40
PERCAP	5880	.32
CONSTANT	186,100	1.99
R^2	.20	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

The results are considerably different when we use only the type of arrangement and cost after stepdown variables. We estimated this equation in two ways: first, we included as independent variables only SALPER and CSTAFTEX; second, we used these two variables plus an interaction term which was the product of the two. We used the interaction term to test the hypothesis that amount of compensation was more closely associated with the cost after stepdown (i.e., complementary inputs) under a percentage than a salary arrangement. Table C-4 shows the results.

TABLE C-4

RADIOLOGY REGRESSIONS

Dependent Variable: Amount of Compensation (IREMUN)

Interaction Term	Excluded		Included	
	Coefficient[a]	t-value	Coefficient[a]	t-value
SALPER	88,900	6.91	- 8,200	- .48
CSTAFTEX	.205	7.31	.0081	.23
(SALPER) x (CSTAFTEX)	-	-	.314	7.04
CONSTANT	-10,700	- .73	55,500	3.78
R^2	.55		.74	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

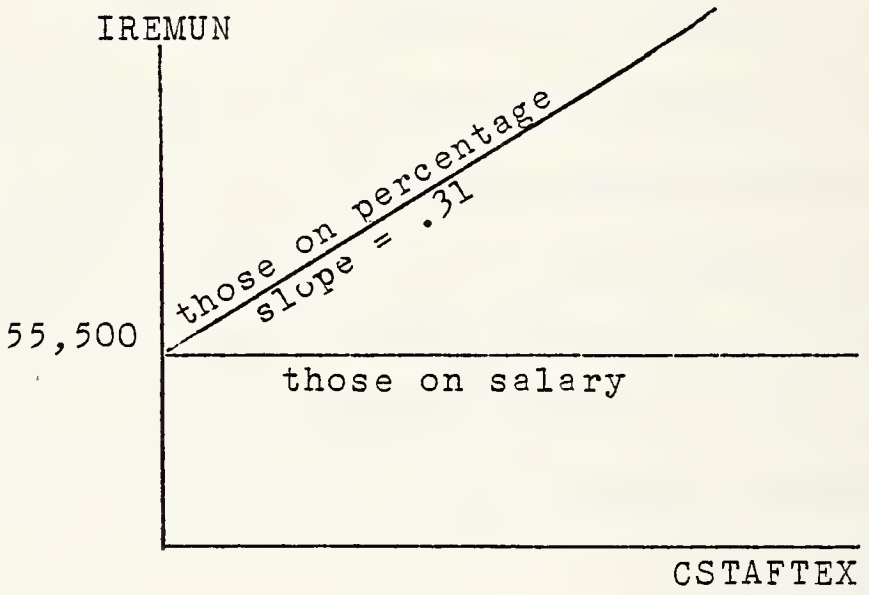
As the table indicates, both regression forms have relatively high R^2 values, but the one including the interaction term is definitely superior. This equation accounts for nearly three-quarters of the variance in the dependent variable.

The formulation without the interaction term suggest that, with cost after stepdown held constant, the difference between a salary and a percentage contractual arrangement in terms of amount of HBP compensation is nearly $90,000. Further, under either arrangement, the amount of compensation appears to increase by about 20 cents for every additional dollar that the cost after stepdown (per FTE HBP) increases.

However, the formulation of the equation which includes the interaction term suggests that the structural relationships between these variables are much different for those under a percentage arrangement than for those under a salary arrangement. In this formulation, both SALPER and CSTAFTEX are statistically

insignificant. This suggests that for those HBP departments in our sample which are under a salary arrangement, the value of CSTAFTEX is irrelevant and the best indicator of amount of compensation is the constant term, which indicates compensation in the amount of $55,500. (This result occurs because the value of the variable SALPER is 0 for departments under salary arrangements.) In contrast, for departments under percentage arrangements (when the value of SALPER is 1), the regression results indicate that the amount of compensation begins with $55,500 as a floor and increases by about 31 cents for every dollar that the cost after stepdown increases. (These comments presume that the value of the coefficients for both SALPER and CSTAFTEX are effectively 0.) These results are shown schematically in Figure C-1.

FIGURE C-1



Note: The figure assumes the coefficients of SALPER and CSTAFTEX both equal 0. The resulting equation is thus-

Under salary: IREMUN = $55,500
Under percentage: IREMUN = $55,500 + 0.31 (CSTAFTEX)

These results suggest that to the extent that the complementary inputs, or other departmental costs, are roughly the same in departments under percentage arrangements and in departments under salary arrangements, the amount of HBP compensation will be greater in the departments under percentage arrangements, and the amount by which they will be greater will be directly proportional to the cost after stepdown per FTE HBP.

These results suggest that HBPs under percentage arrangements would have a strong incentive to increase CSTAFTEX. However, our previous regression for CSTAFTEX indicated that there was no statistically significant difference in CSTAFTEX due to the type of compensation arrangement. In addition, in terms of averages, the radiology departments on salary had an average cost after stepdown of $337,000, while those on a percentage had a lower average of $263,000. Thus, despite the apparent incentive for percentage HBPs to increase CSTAFTEX, our findings imply that the the cost after stepdown is not higher in departments under percentage arrangements and may actually be a bit lower than in departments under salary arrangements. For policy purposes, however, a major concern may be the large <u>potential</u> increase in amount of compensation which may arise under percentage compensation arrangements as the complementary inputs with which the physician works increase.

The difference in regression structures implied by the preceding regression results also suggests that it would be worthwhile to estimate regressions separately for departments under percentage arrangements versus those under salary arrangements.

Unfortunately, in this study, the number of departments under salary arrangements is too small to do this by specialty. (To illustrate, the number of departments under salary arrangements in the samples for these regressions is only 16 for radiology and 23 for pathology. Future research, however, might be designed so as to allow for the separate examination of salary versus percentage arrangements.)

The third step in our approach to amount of compensation was to include in our regression equations both the exogenous and the endogenous variables. Illustrative results are presented in Table C-5.

TABLE C-5

RADIOLOGY REGRESSIONS

Dependent Variable: Amount of Compensation (IREMUN)

	Coefficient[a]	t-value
SALPER	-27,100	-1.32
CSTAFTEX	- .015	- .36
(SALPER) x (CSTAFTEX)	.339	6.73
NOBEDS	19.28	.56
TEACHING	-19,000	-1.26
PROFIT	-11,200	- .73
COSTREIM	- 370	- .80
PROSP	- 467	-1.22
REGIONS--Northeast	- 1,500	- .08
--North Central	3,100	.19
--South	- 5,200	- .31
DOCTOBED	- 11.9	- .29
PERCAP	- 2,625	- .25
CONSTANT	95,700	1.61
R^2	.77	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

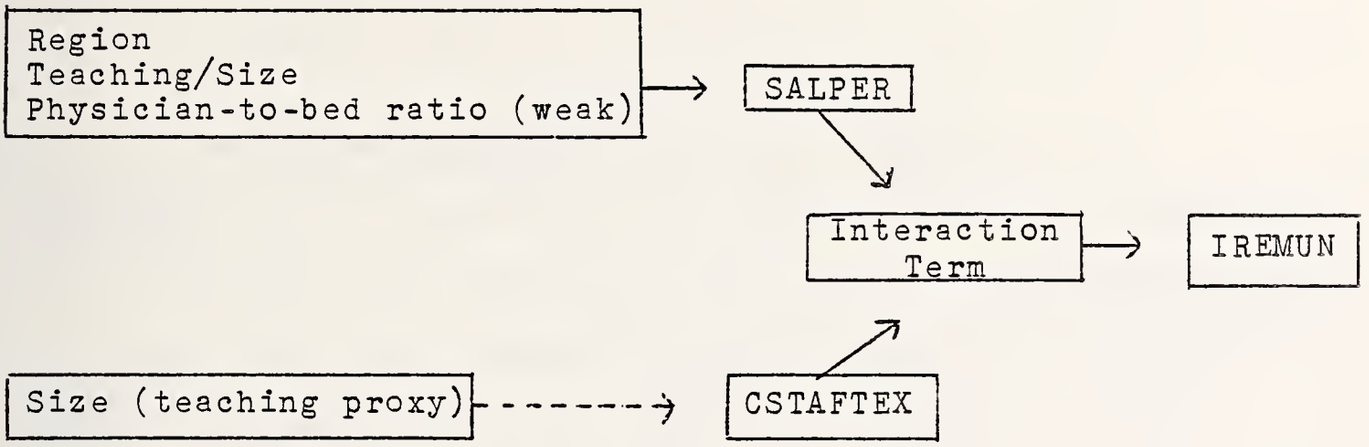
The table indicates that the addition of the exogenous variables to the SALPER, CSTAFTEX, and interaction variables increases the R^2 only from .74 to .77. In addition, all of the exogenous variables are statistically insignificant.

Conclusions for Radiology

In terms of the chart we presented earlier to represent our hypothesized recursive model, the findings for radiology suggest the modifications shown in Figure C-2.

FIGURE C-2

RADIOLOGY RESULTS



First, our results indicate that the type of compensation arrangement is definitely associated with regional location, the teaching status and size of the hospital, and (less strongly) the physician-to-bed ratio. Specifically, the SALPER regression results indicate that salary arrangements are more likely to be found in the Northeast and North Central regions, in large teaching hospitals, and in areas with high physician-to-bed ratios. Second, the type of compensation arrangement does not appear to be related to our measure of complementary inputs; in fact, only the size of

the hospital appears to be related to this measure (the relationship is positive). Finally, the type of compensation arrangement and our measure of complementary inputs interact to account for three-quarters of the variance in the amount of compensation per FTE HBP.

These results are generally consistent with the hypothesis that certain indicators of labor market conditions appear to influence the type of compensation arrangement between the HBP and the hospital. The complementary inputs with which the HBP works do not appear to be systematically related to the type of compensation arrangement or to the other exogenous variables of our model (with the possible exception of hospital size).

For those HBPs under percentage arrangements, the amount of compensation is then directly proportional to our measure of complementary inputs (cost after stepdown). For those on salary arrangements, this proportional arrangement does not exist. We also found that despite the proportional relationship for those under percentage arrangements between cost after stepdown and amount of compensation, the cost after stepdown did not appear to be greater for those under percentage arrangements than for those under salary arrangements.

Before drawing any inferences from these conclusions, we will examine the results for pathology. This is done in the next section.

Results for Pathology

Our procedure for pathology was the same as for radiology. The same basic equations were estimated, with the same hypothesized impacts for the various variables.

Results for Type of Compensation Arrangement

The regression we estimated was one of the same form as for radiology, and the results are presented in Table C-6. The table presents the results including and excluding the teaching and prospective rate setting variables.

TABLE C-6

PATHOLOGY REGRESSIONS

Dependent Variable: SALPER

TEACHING AND PROSP	Excluded		Included	
	Coefficient	t-value	Coefficient	t-value
DOCTOBED	- .00064	-1.53	- .0063	-1.54
PROFIT	- .089	.39	.019	.09
REGIONS--Northeast	- .44	-2.53	- .48	-2.61
--South	- .26	-1.65	- .20	-1.30
--North Central	- .45	-2.39	- .39	-2.13
NOBEDS	- .00077	-2.40	- .00040	-1.15
TEACHING	-	-	- .35	-2.68
COSTREIM	- .0026	- .66	- .0032	- .75
PROSP	-	-	.0033	.77
CONSTANT	1.56	4.47	1.24	3.47
R^2	.32		.40	

These regressions explain from one-third to two-fifths of the variance in the SALPER variable. This is less than was the case for radiology, which was closer to 50%. The results indicate that salary arrangements are more probable in the Northeast and

North Central regions, and possibly also more probable in the South than in the West, when controlling for the other variables. These results are consistent with our descriptive findings.

Also, as was the case for radiology, salary arrangements are more probable in large teaching hospitals. Because of the high correlation between size and teaching status in our sample, the introduction of the teaching variable results in a considerable drop in the significance of the size variable, and the two variables again appear to measure the same phenomenon.

The introduction of the variable for prospective rate setting appears to have no impact on the other variables, particularly the Northeast regional variable, and PROSP is not statistically significant.

The variable for the physician-to-bed ratio appears to be close to significance, and has a negative sign. This indicates that a higher physician-to-bed ratio tends to be associated with a higher probability of salary arrangements, as hypothesized.

The remaining two variables included in our equation, COSTREIM and PROFIT, are both statistically insignificant.

Generally, these results are quite similar to those for the radiologists, although the equation as a whole explains less of the variance in the dependent variable than was the case for radiology. As for radiology, the most important variables appear to be region, hospital size and teaching status (together), and, possibly, the physician-to-bed ratio. The signs of the coefficients

of all these variables are consistent with the hypotheses we stipulated earlier. Also, the results are generally consistent with those which emerged from the descriptive analysis. In other words, even though we utilized multivariate techniques in order to isolate the effects of these variables, the results tended to confirm the main ones which emerged from the descriptive analysis.

Results for Complementary Inputs

We used the same variables for this regression equation as we did for the complementary inputs equation for radiology. The results for pathology are shown in Table C-7.

TABLE C-7

PATHOLOGY REGRESSIONS

Dependent Variable: Complementary Inputs = Cost After Stepdown (CSTAFTEX)

	Coefficient[a]	t-value
SALPER	-187,000	-1.91
PROFIT	- 95,200	- .54
REGIONS--Northeast	293,300	2.31
--South	314,000	2.39
--North Central	15,100	.12
NOBEDS	14.7	.05
COSTREIM	5,086	1.68
OCCRATE	- 4,301	-1.08
PERCAP	173,200	2.21
CONSTANT	- 62,200	- .14
R^2	.26	

[a]All coefficients translate into dollars. The coefficients of the dummy variable and the constant term are rounded to the nearest $100.

The table shows that slightly over one-fourth of the variance in CSTAFTEX is explained by the variables included in this regression. The introduction of the TEACHING and PROSP (not shown

in the table) does not increase the R^2, and both variables are statistically insignificant. The results regarding specific variables are quite different for pathology than for radiology. In the radiology regression, only the NOBEDS variable was statistically significant. In contrast, for pathology, regional differences and per capita income are significant, while NOBEDS is not, and the variable indicating type of compensation arrangement is close to significance.

The regional variables suggest that the cost after step-down per FTE HBP is considerably higher in the Northeast and South regions than in the North Central and West regions. In addition, per capita income is positively associated with CSTAFTEX. These findings are consistent with our hypothesis that differences in price levels, as measured by per capita income, and differences across regions are important in the determination of CSTAFTEX. In contrast to the radiology results, the variable measuring number of beds is not significant.

The SALPER variable, indicating type of compensation arrangement, is close to significance at the 5% level, but the sign of the coefficient is negative. Our hypothesis was that, if significant, this variable would be positively related to CSTAFTEX. That is, we expected that those on a percentage arrangement would be more highly motivated to increase the complementary inputs with which they had to work. In contrast to the hypothesis, the negative coefficient for SALPER suggests that HBPs on a percentage arrangement work with fewer complementary inputs. However, this result may be due to statistical causes resulting from the correlation

between SALPER and the TEACHING variable, acting in the following manner.

The teaching variable was shown in the SALPER regression equation to be negatively associated with the variable, SALPER. In the CSTAFTEX equation without TEACHING, SALPER may therefore absorb some of the effects of teaching status. Teaching hospitals tend to have higher cost after stepdown than do nonteaching hospitals, presumably because of the greater complexity of services they offer and so forth. (For example, in the pathology departments in the sample used for this regression, the departments in teaching hospitals had an average value for cost after stepdown of $585,000 per FTE HBP, while the analogous average in nonteaching hospitals was $456,200.) Therefore, if teaching tends to be linked with a higher CSTAFTEX and a lower SALPER (i.e, 0 rather than 1), this would imply that the exclusion of the teaching variable would tend to make the coefficient of SALPER more negative.

When the teaching variable was included in the regression equation, the results tended to conform with the above line of reasoning. The R^2 of the equation did not increase, and the value of the teaching coefficient was insignificant; however, the coefficient of the SALPER variable became less negative at -$174,600, and its t-value also became less negative and statistically insignificant at -1.66.

Overall, our regression results for CSTAFTEX suggest that cost after stepdown (as a proxy for complementary inputs) is associated with several of the variables of our model, particularly the regional

and per capita income variables. However, the type of compensation arrangement, SALPER, while more significant here than in the radiology equation, still does not appear to be a major factor in the determination of CSTAFTEX. These results, together with our findings for the SALPER equation, suggest that in an equation for the amount of compensation, both SALPER and CSTAFTEX may be acting as proxy variables for some of the exogenous variables of our model. This possibility is examined in the next section.

Results for Amount of Compensation

Our procedure for pathologists was the same as for radiologists. We first estimated regression equations using the exogenous variables only as independent variables (i.e., the variables of box (1) in our schematic model). We then estimated the equation using only SALPER, CSTAFTEX, and an interaction term, to examine how well these variables could account for the variation in amount of compensation per FTE HBP. Finally, we estimated an equation including all of these variables. As indicated in the previous section, we expected the exogenous variables by themselves to have a greater impact on amount of compensation for the pathology departments than was the case for the radiology departments.

Table C-8 presents the results for the regression including only the exogenous variables.

TABLE C-8

PATHOLOGY REGRESSIONS

Dependent Variable: Amount of Compensation (IREMUN)

	Coefficient[a]	t-value
NOBEDS	- 19.9	- .36
TEACHING	- 50,600	-2.51
PROFIT	- 68,500	-1.96
COSTREIM	- 846	-1.26
PROSP	310	.45
REGIONS--Northeast	- 41,100	-1.62
--North Central	- 45,400	-1.57
--South	13,000	.51
DOCTOBED	- 117	-1.59
PERCAP	22,623	1.28
CONSTANT	120,200	1.64
R^2	.27	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

Table C-8 indicates that the exogenous variables account for slightly over a quarter of the variance in the dependent variable; this is somewhat greater than the 20% accounted for in the radiology regression. The significant variables are teaching and profit status, with regional differences and the physician-to-bed ratio relatively close to significance. The teaching variable has the expected negative effect on amount of compensation (i.e., teaching status associated with lower amount of compensation). The association of for-profit hospitals with lower amounts of compensation is consistent with the interpretation that for-profit hospitals attempt to keep costs down by keeping HBP compensation down, although the small number of for-profit hospitals in our sample prevents us from placing too much emphasis on this finding. As was the case in earlier findings, the Northeast region is associated with lower amounts of compensation, probably because of the association in our

sample between teaching hospitals, salary arrangement, and prospective reimbursement in the Northeast region. The negative coefficient of the physician-to-bed ratio is of the hypothesized sign, even though the variable itself is not significant at the 5% level. The North Central region also appears to exert a negative influence on amount of compensation for pathologists (in comparison with compensation in both the South and the West). This is similar to the result for radiologists.

In general, then, it appears that some of the exogenous variables have a bearing on the amount of compensation per FTE HBP. Also, the coefficients of the variables tend to attain a somewhat higher level of significance, and the overall equation has a higher R^2 in the pathology regression as opposed to the radiology regression. Despite this, however, the explanatory power of this equation is fairly low, and we therefore turn to the variables, SALPER and CSTAFTEX.

Table C-9 indicates the importance of SALPER, CSTAFTEX, and the interaction term in the determination of the amount of compensation. The results are quite similar to those we obtained for radiology, although the overall explanatory power (as indicated by the R^2) is considerably less than that obtained for radiology.

As is the case for radiology, a difference in structure between those on a percentage and those on a salary arrangement is quite evident. The interaction term is highly significant, and suggests that for those on a percentage arrangement, an increase of $1.00 in the cost after stepdown increases the amount of

compensation by 14½ cents. Also, in the equation with the interaction term, both the variables SALPER and CSTAFTEX are statistically insignificant. Thus, we can represent the relationship depicted by this regression in the same manner as was done for radiology in Figure C-1. The figure would show that for those pathologists on a salary arrangement, the amount of compensation does not vary with changes in the cost after stepdown, but can be best approximated using the constant term of $50,100. For those on a percentage arrangement, the amount of compensation begins at this point and, as noted above, rises by about 14½ cents for every dollar of cost after stepdown. Even though this would seem to suggest that HBPs on a percentage arrangement have an incentive to drastically increase the cost after stepdown (in order to increase their own remuneration), our results for the CSTAFTEX equation, as well as an examination of the average values of CSTAFTEX for those on salary versus those on percentage, indicate that this is not the case. (We found the same to be true for

TABLE C-9

PATHOLOGY REGRESSIONS

Dependent Variable: Amount of Compensation (IREMUN)

Interaction Term	Excluded		Included	
	Coefficient[a]	t-value	Coefficient[a]	t-value
SALPER	88,000	5.89	13,700	.56
CSTAFTEX	.057	2.74	.0060	.25
(SALPER) x (CSTAFTEX)	-	-	.145	3.63
CONSTANT	15,900	.88	50,100	2.63
R^2	.35		.46	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

radiology.) To illustrate, the coefficient of SALPER in the CSTAFTEX equation was negative, and the average values of CSTAFTEX are $669,400 for the salary departments, in contrast to a much lower figure of $424,500 for the percentage departments.

Thus, when we include only the SALPER, CSTAFTEX, and interaction variables, we can account for nearly half of the variance in amount of compensation. For those with a percentage arrangement, the amount of compensation rises in direct proportion to the cost after stepdown, while for those on salary it does not. Despite this, however, we found no evidence to suggest that HBPs on a percentage arrangement had significantly greater cost after stepdown than those under salary; in fact, the tendency was in the opposite direction. Nevertheless, as we pointed out in the radiology discussion, if outside factors such as technological change tend to continually increase the complementary inputs (equipment and personnel) with which the HBP works, then, our results imply that those under percentage arrangements will experience proportionate increases in their own compensation, while salaried HBPs apparently will not.

As for radiology, the third step in examining amount of compensation for pathology was to include in the regression equations both the exogenous and the endogenous variables. Results are presented in Table C-10.

TABLE C-10

PATHOLOGY REGRESSIONS

Dependent Variable: Amount of Compensation (IREMUN)

	Coefficient[a]	t-value
SALPER	- 2,400	- .09
CSTAFTEX	.006	.25
(SALPER) x (CSTAFTEX)	.14	3.78
NOBEDS	- 5.92	- .14
TEACHING	-27,000	-1.61
PROFIT	-73,700	-2.69
COSTREIM	- 905	-1.68
PROSP	- 13.89	- .03
REGIONS--Northeast	-30,700	-1.27
--North Central	-22,800	- .98
--South	13,600	.64
DOCTOBED	- 79.82	-1.37
PERCAP	21,000	1.47
CONSTANT	73,600	1.18
R^2	.58	

[a]All coefficients translate into dollars. The coefficients of the dummy variables and the constant term are rounded to the nearest $100.

Comparing Table C-10 with Table C-9 indicates that the addition of the exogenous variables increases the R^2 from .46 to .58. The variables SALPER and CSTAFTEX remain insignificant, and the interaction term is highly significant with virtually the same coefficient (.149) as in the previous equation (.145).

The exogenous variables are generally statistically insignificant. When the exogenous variables were run alone (see Table C-8), only TEACHING and PROFIT were significant. In the equation presented in Table C-10, the PROFIT variable is still significant, while the TEACHING variable has become insignificant, probably because of its close association with the variable SALPER.

Thus, although the addition of the exogenous variables improves the fit of the equation by more in the case of pathology than it does for radiology, the general result remains that amount of compensation is most closely related to type of compensation arrangement and our measure of complementary inputs (cost after stepdown).

Conclusions for Pathology

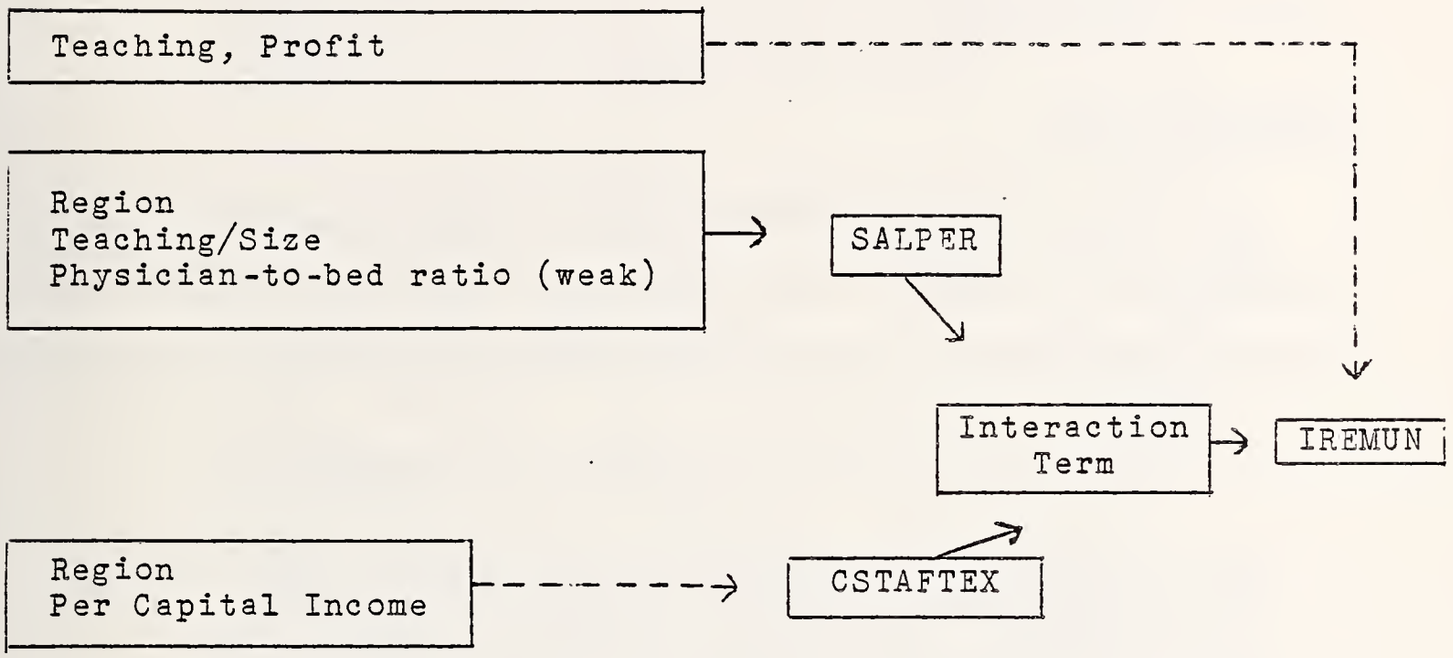
The results for pathology can be presented schematically in a figure similar to Figure C-2, which presented the results for radiology. This is done in Figure C-3. Comparing the results for radiology and pathology, it is apparent that the same basic factors affect the determination of type of compensation arrangement--i.e., region, teaching and size, and the physician-to-bed ratio. In contrast, the relationship of the complementary inputs (CSTAFTEX) to the exogenous variables differs between the two specialties. For radiology, only size appears of any importance; while for pathology, region and per capita income are the most important exogenous variables. However, our key finding for CSTAFTEX is that it does not appear to be significantly affected by the type of compensation arrangement, although the results are not as clear cut for pathology as for radiology. For both pathology and radiology, cost-after-stepdown appears to be greater for those under salary arrangements than those under percentage arrangements.

Therefore, for both specialties, the type of compensation arrangement and our measure of complementary inputs are the major factors affecting the amount of compensation, although the exogenous

variables are of somewhat more importance in the pathology than in the radiology results.

FIGURE C-3

PATHOLOGY RESULTS



MULTIVARIATE ANALYSIS OF RADIOLOGY, PATHOLOGY, CARDIOLOGY, AND EMERGENCY ROOM

D. CONCLUSIONS

Our conclusions from this multivariate analysis fall under three headings: major findings, statistical issues, and policy implications.

Major Findings

The following general findings apply primarily to the specialties of radiology and pathology, since we conducted only overview analyses of the cardiology and emergency room specialties.

1. Regression results for amount of compensation reinforce the findings from the descriptive analysis that, even after controlling for a considerable number of other factors, the difference between the salary arrangement and the percentage arrangement remains. The difference in compensation amounts* appears to be greater than could be accounted for by the fact that HBPs under a percentage arrangement usually have to pay for their own fringe benefits, malpractice insurance and occasionally certain costs of operating their departments.

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*An indication of the difference in amount of compensation implied by our regression results can be obtained from the radiology and pathology regressions using all variables (see Tables C-5 and C-10). Holding all other variables constant, a shift from a salary to a percentage arrangement shifts SALPER from 0 to 1 and also affects the interaction term. Using the mean value of CSTAFTEX for illustrative purposes (for radiology this is $279,000, for pathology $507,300), the following differences emerge between the salary and percentage arrangements in amount of compensation:

Radiology: -27,100 + .339 (279,000) = $67,481
Pathology: - 2,400 + .149 (507,300) = $73,188

These differences appear greater than can be explained by differences in fringe benefits and other expenses.

2. Hospital and area characteristics are more powerful in explaining differences in the type of compensation arrangement between hospitals and HBPs than they are in determining the amount of compensation. The variables which are statistically significant generally conform to the hypothesis that labor market conditions and bargaining power are major factors in the determination of the type of compensation arrangement. The most important characteristics were: region, teaching status and hospital size, and the physician-to-bed ratio. These were also the primary variables for which major differences were revealed in our earlier descriptive analysis. (The exception is the physician-to-bed ratio, which was not examined directly in the descriptive analysis.)

3. Certain hospital and area characteristics which in the descriptive analysis appeared to be related to differences in amount of compensation and type of arrangement were not statistically significant in the multivariate analysis. Examples of these variables are SMSA location, the percentage of hospital revenues obtained through cost reimbursement (COSTREIM), and the percentage of hospital revenues controlled by a formal prospective rate setting program (PROSP).

4. Using the cost after stepdown variable as our proxy measure for the complementary inputs with which the HBP works, it does not appear that the percentage arrangement leads to a greater use of complementary inputs than does the salary arrangement. In fact, if anything, the opposite relationship holds, especially for pathology. That is, cost after stepdown per FTE HBP tends to be higher for those departments under salary arrangements than for those under percentage arrangements.* We therefore have no statistical evidence that HBPs under percentage arrangements deliberately increase the use of personnel and equipment in order to increase their own remuneration.

5. The major variables in statistically determining the amount of compensation of HBPs are the type of compensation arrangement and our measure of complementary inputs (i.e., SALPER and CSTAFTEX). The inclusion of other variables alone, contributes little to the explanation of differences in amount of HBP compensation.

*This may be largely due to the close association between salary arrangements and teaching hospitals. Teaching hospitals are generally higher cost hospitals because of the greater range of services offered and the more complex cases treated.

6. The role played by our measure of complementary inputs in determining the amount of HBP compensation differs according to the type of compensation arrangement. For those under a percentage arrangement the amount of compensation and the cost after stepdown are, not surprisingly, directly proportional to one another. In contrast, however, for those under a salary arrangement the amount of compensation does not vary directly with cost after stepdown. In other words, for those on a salary, the amount of compensation does not rise as other departmental costs rise.

Statistical Issues

The following comments on statistical issues are of two varieties: (1) statistical problems that should be kept in mind when interpreting the multivariate results and (2) possible avenues for research at some future time.

1. The great variety of HBP compensation arrangements meant that we could use only fairly small samples when we focused on pure salary and pure percentage departments.

2. The different relationships under salary versus percentage arrangements between cost after stepdown and amount of compensation suggests that separate analyses for each type of arrangement would be appropriate, although the sample size for salary arrangements would be too small using the present data set (even if the two specialties were pooled).

3. The high degree of multicollinearity among the variables we included in our model make a causal interpretation of the role of specific variables extremely hazardous.

4. The measure we used for complementary inputs (cost after stepdown) is, obviously, not an ideal measure of non-HBP capital and labor inputs. Refined measures are needed to verify and extend our results. Particularly important would be measuring the actual inputs by interns and residents into the production of HBP services, particularly in teaching hospitals. Also valuable

would be case studies of situations with very high versus very low costs after stepdown per FTE HBP to get a better idea of the reasons for the differences.

5. Although our results suggest that a simultaneous equation model is unnecessary, with more complete data such a model may be a more accurate description of reality.

Policy Implications

Because of the just-mentioned problems, we cannot say that a policy which, for example, attempted to prohibit percentage types of arrangements would be successful. It is simply not clear that those now on a percentage arrangement would not be able to obtain the same income in some other form of arrangement, such as a salary.

Nevertheless, our empirical results suggest that when the labor market position of the HBP is weak relative to that of the hospital (i.e., as measured by a high physician-to-bed ratio, and a hospital which is a large teaching institution), then the HBP is more likely to be on a salary than a percentage arrangement. Further, under a salary arrangement, the amount of compensation is typically lower than under a percentage arrangement by an amount which appears to exceed that attributable to the extra costs the HBP on a percentage arrangement must bear. Beyond this, the amount of compensation of the salaried HBP does not rise in direct proportion to the other costs associated with his department, and such a directly proportionate increase does occur for those under percentage arrangements. This implies that those under salary arrangements are less likely than those under percentage arrangements

to benefit automatically in terms of amount of compensation from technological and other changes which increase departmental costs, and this is an important factor to consider in future policy decisions affecting the reimbursement of HBPs.

HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

EXPLORATORY CASE STUDIES OF THE EFFECTS OF PROSPECTIVE REIMBURSEMENT ON HBP COMPENSATION AND PRACTICE ARRANGEMENTS

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STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

EXPLORATORY CASE STUDIES OF THE EFFECTS OF PROSPECTIVE REIMBURSEMENT ON HBP COMPENSATION AND PRACTICE ARRANGEMENTS

A. INTRODUCTION

The Exploratory Case Studies of Prospective Reimbursement (PR) in New York State represent the third segment of Phase II of the overall Study of Reimbursement and Practice Arrangements of Provider-Base Physicians. The exploratory case studies have three primary objectives:

1. To examine how the New York formula rate setting system has affected hospital-based physicians (especially Radiology, Pathology, Cardiology, Anesthesiology, and Emergency Room) and the hospitals in which they practice.

2. To validate several of the findings and assumptions of the previous aspects of the study.

3. To explore the potential impacts of possible policy changes affecting hospital-based physicians.

In addition, an attempt has been made, during the course of the examination, to identify any issues relating to New York State prospective reimbursement that may deserve further research.

The scope of work for this segment includes the following major components:

1. The development of a research design (submitted to HCFA in January, 1977).

2. The selection of ten hospitals to participate in the case studies.

3. The informal interviewing of administrative and financial personnel and physicians in the ten hospitals.

4. The collection of a limited amount of data for the years 1969, 1971, 1973 and 1975 from each hospital.

5. The compilation of the information obtained from the interviews and data collection.

6. The preparation of this report.

A more detailed description of our approach is presented in Section C.

It is important to emphasize, before proceeding, that this segment of the study involves exploratory case studies only. The intent was simply to take a first step towards understanding PR and its impact on HBPs. Because of the relatively small number of hospitals and HBPs involved, rigorous quantitative analysis has intentionally been avoided. The findings presented in Section D represent a consolidation of the opinions and experiences of the HBPs and administrative personnel who were interviewed.

EXPLORATORY CASE STUDIES OF THE EFFECTS OF PROSPECTIVE REIMBURSEMENT ON HBP COMPENSATION AND PRACTICE ARRANGEMENTS

B. PROSPECTIVE REIMBURSEMENT IN NEW YORK STATE

This section presents a general description of how the New York State prospective reimbursement (PR) system works. This material provides background information that is helpful in interpreting the findings presented in Section D.

New York State was selected for our exploratory case studies of prospective reimbursement for two major reasons. First, PR has been in effect in New York State since 1970, making it one of the older PR systems in the nation. Second, previous studies have indicated that PR has slowed the rate of increase of hospital costs in New York State.

A number of other studies of prospective reimbursement in New York State have been performed. Examples of these other studies are:

- Evaluation of Blue Cross and Medicaid Prospective Reimbursement Systems in Downstate New York, William L. Dowling, et. al., Department of Health Services, School of Public Health and Community Medicine, University of Washington, June, 1976.

- An Analysis of Prospective Payment Systems in Upstate New York, Abt Associates Inc., November, 1976.

- New York: The Formula Approach to Prospective Reimbursement, Katherine G. Bauer and Arva R. Clark, Harvard University Center for Community Health and Medical Care, April, 1976.

Each of these reports contains a detailed explanation of how the New York State PR system works. A reader who desires more detail than that presented below is referred to these other reports.

PR in New York is a fairly complex and dynamic system. The description that follows is intended to be brief and uncomplicated. In presenting this overview, some degree of oversimplification is unavoidable.

PR is an approach to hospital reimbursement in which the rates to be paid for specified services are determined <u>in advance</u> by an outside authority. By controlling or restricting a hospital's revenue, PR attempts to provide the hospital with a strong incentive to contain costs in order to avoid a loss. The major difference between PR and more traditional retrospective approaches is that, under PR, a hospital's reimbursement is not based on the costs it actually incurs.

There are actually three different PR systems in effect in New York State:

1. The state-wide Medicaid system
2. The New York (City) Blue Cross system covering the 17-county Greater New York City area (downstate)
3. The upstate New York System jointly operated by the 7 upstate Blue Cross plans

The similarities between the three systems greatly outweigh the differences, and in the general description that follows, the differences will be ignored.

PR in New York State utilizes a formula to establish a per diem reimbursement rate for each hospital. The per diem rate for each year is based on the actual per diem cost two years earlier, increased for estimated inflation during the two intervening years.

The basic formula can be altered for individual hospitals based on their performance relative to a variety of ceilings and floors that have been established. Each hospital is grouped with a few other hospitals having similar characteristics in terms of size, location, teaching status and ownership. One ceiling that was in effect prior to 1976 limited a hospital's base year (two years previous) per diem cost to 110% of the average for the hospital's group. In 1976 this ceiling was lowered from 110% to 100% of the group average. Another restriction, also instituted in 1976, is that this group average ceiling is applied separately to both routine and ancillary costs. If a hospital exceeds either ceiling, the base year allowable costs used in the formula will be less than the hospital's actual allowable costs in the base year.

There are also several minimum occupancy rates which must be met in order to avoid penalties. Specifically, they are 60% in obstetric units, 70% in pediatric units, and 80% to 85% in medical-surgical units depending upon population density. Any hospital which fails to achieve the minimum level of utilization in one or more of these areas will have its per diem reimbursement rate lowered.

In addition to these ceilings and floors, a variety of other restrictions have been instituted. Examples of these are:

- Disallowing 10% of the cost of certain teaching programs and of certain inpatient services provided by teaching hospitals that could have been performed in nonteaching hospitals.
- Eliminating the right of hospitals to appeal for rate increases based on extraordinary and uncontrollable cost increases in certain areas, such as fuel, pension (ERISA), and malpractice insurance.
- Imposing rate penalties on hospitals whose average length of stay exceeds the average for their group.

There is an appeal process available to hospitals. Appeals can be based on a variety of issues related to the rate setting process, such as inequitable grouping, changes in basic cost factors (number of beds, services offered, etc.), special circumstances, etc.

The preceding description has been presented to give the reader an appreciation of the complexity of the PR system in New York State. Hospital personnel had a great deal to say about the system itself. In general, there was agreement that the fundamental concept behind PR was sound and that the New York State system had brought about a considerable amount of cost containment beneficial to the entire health care system.

However, there was also consistent criticism of several aspects of the system. Most of the financial and administrative interviewees felt that the system was inflexible and arbitrary. Seven of the ten hospitals felt that they had been unfairly grouped with dissimilar hospitals. All of the hospitals felt that the

restrictions on appealing fuel, pension (ERISA), and malpractice insurance cost increases were unfair. Most felt the appeal process was extremely slow. Many believed that the number of restrictions have increased sharply in the last year or two and that even more are being considered for the near future. A commonly expressed opinion was that New York State was using the PR system to manipulate the hospital system in an effort to solve its own serious financial problems and that this was putting a very tight squeeze on all hospitals in order to cut back the number of beds in certain areas.

In closing this section, it should be pointed out that the formula approach to PR in New York State is not typical of all PR systems. In a number of other states, the PR systems are based on a prospective review of a hospital's budget for the next year. Once approved, the budget then serves as the basis for the reimbursement to the hospital. This approach has the potential for being more flexible in recognizing the unique characteristics of each hospital, while retaining the ability to control the rate at which hospital costs increase.

C. METHODOLOGY

This section describes the approach that was followed in performing the New York State study. The first part discusses the selection of participating hospitals. It also summarizes the characteristics of the participating hospitals and the number of physicians, by specialty, covered by the study. The second part describes how the information in this report was obtained from the hospitals.

Provider and Physician Participation

The selection of candidate hospitals began with a visit to the Hospital Association of New York State Inc. (HANYS) in Albany. HANYS was aware of our study and had willingly agreed to cooperate. It was agreed that since the approach was to involve informal, exploratory case studies of only ten hospitals, a rigorous statistical sampling approach was not warranted. However, the project team did specify three criteria for which variations in the candidate hospitals were desirable:

1. teaching vs. nonteaching,
2. urban vs. rural, and
3. strong vs. weak financial position.

The first two criteria were chosen because of our Segment II findings, and the last because of our desire to discuss the effects of prospective reimbursement (PR) both with hospitals that seemed to be financially sound and with those that were experiencing financial difficulties.

Based on these criteria, sixteen candidate hospitals, widely distributed across the state, were identified. Initially, letters were sent by HANYS to twelve of the candidates explaining the study and encouraging them to participate. Exactly ten of the initial twelve agreed to participate, so the four remaining candidates were never involved.

A summary of the key characteristics of the ten participating hospitals is presented in Table C-1. Several comments should be made concerning the selection process and the hospital participation that resulted. The selection process was not random. As stated earlier, because of the informal, exploratory nature of the study and the small number of hospitals to be included, rigorous statistical approaches were not appropriate.

The selection of candidate hospitals was biased to the extent that only members of HANYS were considered. Also, HANYS recommended hospitals which it thought would be likely to participate. The results of these biases can be seen in Table C-1. The selected hospitals tended to be large, urban, and in a relatively strong financial position. The findings presented in the next section must be considered to be biased toward hospitals having these characteristics.

TABLE C-1

KEY CHARACTERISTICS OF PARTICIPATING HOSPITALS

Teaching Status

(Based on medical school affiliation reported by American Medical Association, November, 1974)

Teaching	4
Nonteaching	6
	10

Urban/Rural Location

(Based on whether or not the hospital is located in an SMSA)

Urban	8
Rural	2
	10

Financial Position

(Based on an informed, but informal, appraisal by HANYS personnel)

Relatively strong	7
Relatively weak	3
	10

Size

(Based on the number of general service beds in use at the end of fiscal year 1975)

Less than 300 beds	3
300 or more beds	7
	10

Table C-2 contains the number of hospital-based physicians (HBPs), by specialty, covered by this aspect of the study. These numbers are entirely dependent on the staffing patterns in the ten selected hospitals. Note that the table includes only physicians who are paid by the hospital (as opposed to those who bill patients directly) and only those groups whose numbers could be accurately stated by hospital personnel. These restrictions explain why values below ten appear in the "Number of Departments" column. Three of the ten radiology departments bill patients directly. The same is true of one pathology department and eight anesthesiology departments. In cardiology only one of the ten departments bills directly, but five others are large, independent groups for which accurate physician counts were not available.

Information Gathering

Information was collected from each of the ten participating hospitals in two ways:

1. through informal interviews with administrative and financial personnel and with physicians, and
2. on a data collection form that was completed by hospital personnel.

The interviews were conducted by two members of the project team during a one-day visit to each hospital. The interviews ranged from one-half hour to several hours in length. A standard discussion outline was sent to the hospitals in advance and served as a checklist to ensure that all important topics were covered. The

TABLE C-2

HOSPITAL-BASED PHYSICIANS (HBPs) BY SPECIALTY

Specialty	Number of HBPs	Number of Departments
Radiology	32	7
Pathology	30	9
Anesthesiology	23	2
Cardiology	14	4
Emergency Room	55	10
Total	154	

Note:

The HBP counts include only physicians who are paid by the hospital (as opposed to those who bill patients directly). This explains all cases where the department count is less than 10 except cardiology. In cardiology, only 1 of the 10 departments billed directly. However, in 5 of the remaining 9 cases, cardiology service was provided by large, independent groups. Although these groups were paid by the hospitals, the hospitals were unable to supply accurate counts of the numbers of physicians involved.

topics that appeared on the discussion outline are restated in the introductory part of Section D.

In every hospital the interviewees included at least one of the top administrative or financial executives. In most cases, several of these executives were interviewed. In addition, as many of the following individuals as possible were interviewed:

- medical director
- chiefs of surgery and medicine, and
- representatives of HBP groups.

The ability to talk to these individuals was controlled by their availability and by the hospital's willingness to let them be interviewed. In two hospitals none of these individuals was interviewed. In the other eight, the number ranged from two to eight. It should be noted that the findings reported in the next chapter may be biased based on the types of individuals interviewed in general and based on the variations in interviewees from hospital to hospital.

The data collection form was made as short and simple as possible to minimize the effort required of hospital personnel to complete it. All data were requested for the four fiscal years ended in 1969, 1971, 1973 and 1975. The first page asked for hospital level data concerning basic characteristics (size, teaching status, etc.), financial highlights, and key statistics (patient days, length of stay, occupancy rate). The remaining pages asked for a standard set of data for each of the five major

HBP departments--radiology, pathology, anesthesiology, cardiology and emergency room. This department level data included HBP counts, full-time equivalent counts, amounts and methods of remuneration, output volumes and financial highlights. Although there were some difficulties in getting the forms completed and some inconsistencies in the way data were recorded, these data sheets provided a variety of information which is reflected in the findings presented in Section D.

EXPLORATORY CASE STUDIES OF THE EFFECTS OF PROSPECTIVE REIMBURSEMENT ON HBP COMPENSATION AND PRACTICE ARRANGEMENTS

D. FINDINGS

Introduction

In this section, the findings that resulted from the interviews with physicians and administrative personnel in the ten hospitals are discussed. Due to the exploratory nature of the study and the fact that no effort is made to examine the State government's point of view, no attempt is made to draw conclusions from the facts derived from the interviews. Instead, the focus is upon revealing the most significant responses to the questions asked during the course of the discussions. It should be emphasized that these findings, with the exception of some financial data collected, represent only the opinions and feelings of the interviewees. In addition to relating these answers, an effort to identify areas for further research is also made.

The primary objective of the exploratory case studies was to gain an understanding from the administrators and physicians of the past, present, and future effects of prospective reimbursement (PR) on hospital-based physicians (HBPs) and on the hospitals in which they practice. For this reason, the questions on the discussion outline were designed to draw out the differences between the physician and hospital environment under PR (i.e., since 1970) versus the pre-PR environment. Areas were identified that were considered most likely to result in significant differences, and questions were directed toward these topics.

The questions are broken down into four groups. The first group of questions relate specifically to HBPs. However, the findings for these questions represent the responses of both the administrative personnel and the physicians interviewed. The second group includes questions that relate to the hospital in general. These are questions that were primarily asked of hospital administrators and financial personnel, and the findings detailed below represent their statements and opinions. However, where the interview with the administration turned up areas that could be effectively discussed with the physicians, the subject was explored further in the physician interviews. The third group includes questions developed to determine the validity of some of the findings and assumptions made in earlier aspects of the study. The fourth group relates to future considerations regarding prospective reimbursement in New York State. The findings for these last two groups of questions represent the comments of both the administrators and the physicians.

The questions that relate to HBPs include:

- Has prospective rate setting caused the HBPs to alter their contractual arrangements with the hospital through a shift to-
  - a direct billing arrangement,
  - a percentage arrangement, or
  - any other arrangement?
- Has prospective rate setting materially affected HBP compensation?

The hospital-related questions include:

- How has the rate setting system affected the hospital and how has the hospital adjusted in the following areas-
  - financial position,
  - service mix,
  - patient mix,
  - teaching programs,
  - hospital personnel,
  - dealings with suppliers, and
  - expenditures for capital equipment?
- Is the hospital now in a better position to control costs than before prospective rate setting?
- Is the financial pressure from prospective rate setting increasing, decreasing or remaining about the same?
- What factors other than prospective rate setting are significantly affecting hospital finances?

The questions relating to the verifications of previous findings and assumptions include:

- Questions dealing with the conversion of HBP compensation to a full-time equivalent (FTE) basis.
  - Is a 2,080 hour year (40 hour week) a reasonable basis for defining one FTE HBP?
  - Is it reasonable to estimate the FTE earnings of an HBP who works only part-time at a hospital by extrapolation based on the compensation and FTE data supplied by the hospital?
  - Is there a better approach?
- Questions dealing with differences in the benefits received and expenses paid by HBPs on salary versus percentage compensation arrangements.
  - What hospital-paid fringe benefits are received by salaried HBPs?
  - What expenses do HBPs on percentage contracts pay for out of the compensation they receive from the hospital?

The questions that relate to future considerations include:

- What would be the impact on the HBPs and the hospital of various governmental policy changes including-
  - the prohibition of percentage arrangements for HBP compensation,
  - restricting HBP compensation to a salary plus legitimate expenses,
  - requiring disclosure of total income?
- What is the expected future effect of prospective rate setting on HBPs?
- Where will prospective rate setting lead?

Qualifications

The subsections below address each of the aforementioned questions. However, there are several qualifications that should be clearly understood before reading the findings.

As mentioned in Section C, the sample was selected through the Hospital Association of New York State (HANYS). No attempt was made to make a random selection, and, as a result, the sample reflects the bias toward large, urban hospitals in relatively strong financial position, as shown in Table C-1.

Another bias to the sample resulted from the types and number of personnel interviewed at each hosptial. As was discussed in Section C, the number and specialties of physicians interviewed varied greatly from hospital to hospital. Even the administrative personnel interviewed varied somewhat at each institution. While an attempt was made to speak to both the hospital's administrator and its director of finance or controller, in some cases access to the administrator was limited. As a result, some of the information

and opinions derived from the interviews could reflect the unique biases of the individuals that participated. It should also be pointed out that these exploratory case studies included only hospital personnel. Our findings do not present the viewpoints of New York State or any of the third-party intermediaries.

An additional qualification that should be emphasized is the possibility of a causal fallacy. PR is not the only factor that has had significant influence upon hospitals in New York State. Other factors that the hospitals considered significant are listed in Subsection H of the Hospital-Related Issues Section below. Despite the fact that we did ask the interviewees to respond to the impact of PR specifically, it is likely that in many cases these other issues have had some indirect influence.

Hospital-Based Physician Issues

A. Contractual Arrangements

The response to the line of questions regarding changes in contractual arrangements with HBPs was quite varied. The two major types of variations were those from one specialty to the next and those between different types of hospitals. These differences are detailed below and, in addition, trends toward direct billing, other contractual arrangements, or the amendment of existing arrangements are also discussed.

1. Departmental Differences

The scope of our study included only the departments of radiology, pathology, anesthesiology, cardiology, and emergency room.

Table D-1 summarizes the compensation arrangements in the hospitals, and the following paragraphs describe the types of contractual arrangements that were found in these five specialties at the ten sample hospitals. Table D-2 is a summary of the shifts between different types of compensation arrangements that have taken place in the five departments since 1970.

The contractual arrangements with the radiologists in the ten hospitals covered a wide range of possibilities. The most prevalent arrangement, existing in four out of the ten, was salary. One of these salary arrangements came about in 1972 as a shift from a percentage of gross. The next most common arrangement, used in three hospitals, was direct billing. All of these arrangements came as a result of shifts from other arrangements in the past five years. Two were shifts from salaries and one was from a percentage of gross contract. Of the remaining three hospitals: one compensated radiologists through a percentage of net arrangement; one used a fee-for-service arrangement; and one used a salary plus fee-for-service arrangement. The last arrangement resulted from a recent shift from percentage of gross.

Six of the ten hospitals compensated their pathologists through a salary. Of the remaining four: one was fee-for-service; one was a salary plus a percentage of net arrangement; one was salary plus fee-for-service; and the last was direct billing. Only one of the ten, the salary plus a fee-for-service, was a shift from another arrangement. It had previously been based on relative value units.

TABLE D-1

COMPENSATION ARRANGEMENTS BY DEPARTMENT
IN TEN CASE HOSPITALS

	Salary	Salary Plus Percent of Net	Salary Plus Fee-for-Service	Percent of Net	Fee-for-Service	Direct Billing
Radiology	4	0	1	1	1	3
Pathology	6	1	1	0	1	1
Anesthesiology	0	0	0	0	2	8
Emergency Room	7	3	0	0	0	0
Cardiology	0	0	3	0	6	1
	17	4	5	1	10	13

TABLE D-2

DEPARTMENT SHIFTS IN COMPENSATION ARRANGEMENTS*

From \ To	Direct Billing	Salary	Salary Plus Fee-for-Service	Fee-for-Service
Salary	2R	-	-	-
Percent of Gross	1R	1R	1R	1C
Fee for Service	1A	-	-	-
Relative Value Units	-	-	1P	-

*The type of department is denoted as follows:

R = radiology
P = pathology
C = cardiology
A = anesthesiology

For example, 2R indicates two radiology departments.

There were no shifts in emergency room.

Eight of the ten hospitals had a direct billing arrangement with their anesthesiologists. The anesthesiologists in the other two hospitals were paid by the hospital on a fee-for-service basis. Only one hospital had experienced a recent shift in an anesthesiology arrangement and that was from a fee-for-service paid by the hospital to direct billing.

Six of the ten hospitals compensated their cardiologists on a fee-for-service arrangement in which the hospital billed the patient and paid the HBP. Three of the remaining four hospitals compensated cardiologists through a combination arrangement which included a fixed base salary plus a fee-for-service paid by the hospital. In only one hospital were the cardiologists on a direct billing arrangement. As was the case for anesthesiologists, there had been little movement between types of arrangements in this specialty. The only shift in this specialty was within the last year and from a percentage of gross to a fee-for-service arrangement.

Seven of the ten hospitals had salary arrangements in their emergency room. The other three had combination arrangements in which the HBPs received a base salary plus a percentage of the department's net revenue. There did not appear to be any movement toward any different types of compensation arrangements in the specialty.

2. Hospital Differences

As stated in Section C, the sample of hospitals is homogeneous in the sense that the hospitals tend to be large, urban,

and in relatively strong financial position. However, there are differences that do correspond to variations in contractual arrangements.

In the four hospitals that were affiliated with an university teaching program, salary arrangements with HBPs had been predominant as late as 1975. As a result of recent pressure on teaching hospitals from PR, these HBPs have found it increasingly difficult to secure satisfactory increases in their remuneration. For this reason, two of the four institutions had shifted to direct billing since 1975 and a third was considering the same shift. In two of the three cases that had shifted or were considering shifting, this shift was mutually agreed upon by both the HBPs and the hospital. The physicians felt they could increase their remuneration by going to direct billing, while the administrators knew they could more easily stay below their cost ceilings without the HBP compensation component in their cost. In the third case, the HBPs were pressured into the direct billing arrangement by the hospital in order to eliminate the HBP's compensation from the hospital's cost base, which had exceeded the applicable ceiling.

The six nonteaching hospitals were much less likely to have had salary arrangements with their HBPs. In 1975, only one of the six institutions was using the salary arrangement predominantly.

While it was difficult to discern a difference in arrangement based upon an urban versus rural dichotomy, it was possible to draw a distinction between downstate hospitals (New York City and the 17 surrounding counties) and upstate hospitals (the rest of New

York State). The HBPs at the downstate hospitals seemed to be less inclined to go to direct billing arrangements than those in the upstate institutions. This was at least partially due to the fact that the HBPs believed there was an excess of physicians in the downstate area and that there would be much more competition if they were to shift to direct billing.

3. Compensation Arrangement Trends

a. Direct Billing

The only trend toward direct billing in evidence was that which occurred in the radiology departments of three hospitals. This was in keeping with the point made by some interviewees that radiologists are more inclined to go to direct billing since the overhead required to set up their own billing operations is less than that in other specialties. However, interviews with radiologists in other hospitals as well as the pathologists in general seemed to indicate that if the difficulty they had experienced in recent remuneration negotiation increased, or if governmental controls (through compensation ceilings, required disclosure of income, etc.) on them became more comprehensive, they too would consider turning to direct billing. In addition, the HBPs' inclination to go to direct billing has been increased by the advice of their professional societies.

In some cases, the administrators also voiced an interest in having their HBPs go to direct billing. This can best be explained by considering that if a hospital has exceeded or is close to exceeding its cost ceiling, it can be in the hospital's best interest to

have its HBPs billing direct. However, some administrators were also wary of the loss of managerial control that would result from the HBPs going to direct billing.

Both the administrators and the HBPs were concerned that a direct billing arrangement would probably increase the cost of medical care to the public. The administrator of one hospital had specific figures to support this concern. The group of radiologists in his hospital had switched from salary to direct billing in 1972, at the HBPs' insistence. In its last full year under a salary arrangement, the group consisted of four HBPs who were paid a total of less than $150,000 by the hospital. The administrator had subsequently seen the results of the group's operations for a recently completed year. He reported that the same group, now consisting of five HBPs, had generated gross revenues of approximately $850,000 under the direct billing arrangement. The group continued to practice under similar circumstances in the same hospital. According to the administrator the only additional costs now borne by the HBPs (under their direct billing arrangements) were one or two billing clerks, some computer time, plus their own fringe benefits, malpractice insurance, etc. In spite of examples like this, in some hospitals the concensus was that shifting HBPs to direct billing was a viable alternative worthy of serious consideration.

b. Other Arrangements

There did not appear to be any consistent trends toward any other types of contractual arrangements with HBPs. Generally

speaking, the hospital administration, with the exception of the situation in which it would be inclined to prefer direct billing, seemed to prefer a salary arrangement with HBPs. Many of the HBPs, on the other hand, seemed to favor some alternative to a straight salary arrangement. However, there were those HBPs who were not prepared to take on the burden of a direct billing practice and those that preferred the regularity of salary to a compensation dependent upon departmental revenue or number of procedures. In addition, some HBPs simply felt that despite the possibility for greater income under some other form of contractual agreement, their salary was adequate and that their arrangement was best for their hospital and the community it served.

c. Amendment of Contractual Terms

It appeared that a regular review of the terms of the HBP contractual arrangements was a standard procedure in the hospitals interviewed. In most cases, this occurred on an annual basis.

In four of the ten hospitals, we observed some concern on the part of HBPs over either their inability to obtain cost of living increases to their compensation, or difficulty in maintaining the same level of fringe benefits they had received in the past. Some hospitals were not giving full cost of living increases to their salaried HBPs, especially if they were in the higher salary brackets. Other institutions were eliminating fringes like malpractice insurance, pensions and reimbursement for medical conference expense.

In two of the larger, urban hospitals, we observed a desire by the HBPs to change their oral arrangements to written contractual arrangements. In one of these two cases, the HBPs stated their motivation was at least partially due to advice from their professional societies. However, HBPs in both hospitals stated that, in light of recent cost cutting, they desired a precisely worded written arrangement with the hospital. The HBPs in smaller, community hospitals seemed satisfied with their oral arrangements.

B. Remuneration

The overall feeling of both the administrators and HBPs seemed to be that PR had had some negative impact upon HBP remuneration, but that it was not substantial. As mentioned in the previous section, some of the annual compensation reviews had resulted in increases that did not keep pace with the cost of living and there was evidence that some fringe benefits were being cut back. However, most HBPs seemed to feel that their remuneration was still quite adequate and that what little they had lost was not a major concern. In most cases, the HBPs were quite understanding of the hospitals' position and seemed to blame the State for the hospitals' financial difficulties.

C. Overall Hospital-Based Physician Comments

The single most striking impression derived from the interviews with the HBPs was the physicians' lack of knowledge about PR in general. While many of them were aware of the financial

difficulties of the hospital through their own remuneration negotiations and through budget meetings in which they had problems obtaining funds for new capital equipment and additional technical staff, many of the HBPs did not know why. Several of the hospital administrators were aware of this problem, and some thought it would be beneficial to have the physicians better informed about PR. However, they maintained that this was difficult due to the complex and dynamic nature of New York PR.

Hospital-Related Issues

This subsection details the responses of the administrators and financial personnel to the various hospital questions. Table D-3 summarizes the impact of PR upon the issues addressed by these questions, and the following discussions detail that impact.

A. Financial Position

Only three of the ten hospitals interviewed appeared to be in weak financial position. The classification of a hospital's financial position as weak is based upon a determination that the institution would, if recent trends continued, be unable to meet its financial obligations in the next few years. Such classification of the hospitals was somewhat difficult due to the fact that some hospitals made an attempt to offset an unfavorable appearance in their income statement by tapping some of their sources of nonoperating revenue. For example, one hospital that had shown operating losses since 1971, had shown positive net income after nonoperating revenues and expenses since 1973. In this hospital, the administration

TABLE D-3

IMPACT OF PR UPON VARIOUS HOSPITAL ISSUES

Issue*	Major Impact	Minor Impact	Little or No Impact
Weakened Financial Position	3	7	0
Reduced Service Mix	4	6	0
Limited Patient Mix	0	1	9
Cutback Teaching Programs	4	5	1
Cutback Hospital Staff	1	7	2
Improved Provisions with Suppliers	0	10	0
Reduced Capital Equipment Expenditures	3	5	2
Improved Cost Control	3	6	1
Reduced Quality of Care	0	3	7

*Details of the impact of PR upon these issues have been provided in the accompanying text.

maintained that only "windfall donations" had kept them operating at an acceptable level of service. This and other hospitals also expressed the concern that these reserves they had been relying upon were rapidly dwindling.

The hospitals that appeared to be in a stronger financial position were so due to their ability to adjust to operating under rate setting regulations. Such adjustments were made possible, in some cases, through fortunate circumstances.

Those that were less efficient prior to the institution of prospective rate setting in 1970 found themselves with a higher reimbursement base and a greater potential to reduce costs than those hospitals that had been more efficient in 1970. As a result, two hospitals maintained that the PR system penalized them unfairly for their cost containment efforts prior to 1970. In addition, some institutions found that they were benefiting from a fortunate grouping* with their peers. Some hospitals that appeared to be in a stronger financial position were also benefiting from their ability to react to the PR system. Various strategies to improve reimbursement have been employed by the hospitals, above and beyond mere cost cutting.

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*Grouping four or five hospitals together is the technique that the PR system in New York uses to establish the "average" volume and expenditure levels for hospitals that have "common" characteristics. However, there is much question about the equity of the grouping procedure. Many administrators felt the groupings were little more than arbitrary assignments, and that as a result, their institutions were being compared to hospitals much different than theirs.

Hospital-based physicians are likely to be affected by such strategies, which, due to the nature of the PR formula, may improve a hospital's reimbursement position. Examples include increasing hospital occupancy rate and altering the HBP's compensation arrangement with the hospital. Several administrators interviewed expressed a desire to have HBPs under a percentage type of compensation arrangement "to bring business into the hospital." Another preferred all HBPs (with the exception of emergency room physicians and cardiologists) to be on a direct billing arrangement.

Additionally, the financial constraints imposed upon the hospitals may restrict them from paying competitive salaries to HBPs who are covered under salary arrangements. Both physicians and administrative personnel interviewed feared that many pathologists would be leaving the State as a result of low salaries believed to result from the PR system.

It should be mentioned that the strategies discussed in this section are not necessarily the most efficient action to take from the viewpoint of the health care system in general, but that they can be very sensible, economical steps for the hospitals to take.

B. Service Mix

Four of the ten hospitals stated that they had either eliminated or cut back service in certain departments. As a result of the penalties for underutilization of certain departments under PR, some hospitals have been forced to discontinue the use of little-used equipment, retrain or cut back technical staff, and/or eliminate entire programs.

Of the remaining six hospitals, many were giving serious consideration to the elimination and/or curtailment of certain services. In some of these cases, the institutions were incurring PR penalties for maintaining an obstetrics department, a radiation therapy department, or other service in order to provide comprehensive service and high quality care to their communities.

The impact of the PR system may also be reflected in a hospital's inability to attract HBP specialists which, in turn, may affect the range of service offered. One Chief of Surgery interviewed felt that it was becoming increasingly difficult for a hospital to attract new surgeons in areas that require other specialists (e.g., radiologists) as part of a team, since the PR system had made it tougher for hospitals to attract new radiologists.

C. Patient Mix

Only one of the ten hospitals was taking any serious steps toward restricting its patient mix. The general sentiment seemed to be that the institution had very little control over the kinds of patients it admitted.

The one hospital that did seem to be taking steps toward restricting the mix was doing so only indirectly by considering withdrawal from its Blue Cross and Blue Shield contracts. Since patients could still have Blue Cross coverage and be personally reimbursed, the hospital was not directly discriminating in its admissions. However, since patients would, in most cases, have to pay more for their care under this arrangement, it was expected

that most elective cases with Blue Cross coverage would go to hospitals that retained their affiliation with the coverage.

D. Teaching Programs

Only four of the ten hospitals in our study were teaching hospitals in the sense that they had a university affiliation, but most of the remaining six had some teaching responsibility through resident and/or intern programs. In virtually all of the university-affiliated hospitals, PR had resulted in some cutbacks in teaching programs. Examples of these cutbacks included the elimination of a nursing school in one hospital, the termination of a residency program in another, and a reduction in the number of interns in a third. Only one of the hospitals with a university affiliation stated that its teaching program had not been affected.

Due to the institution of a PR policy under which only 90% of the cost of teaching programs are reimbursed, hospitals have found this area to be one of the prime areas for cost cutting. While the elimination or cutback of these programs had little impact on the smaller upstate hospitals, the larger teaching institutions were more severely affected. University-affiliated teaching hospitals tended to have a greater percentage of their services provided by interns and residents and as a result suffered more from the partial reimbursement. In addition, this latter group of hospitals felt that their ability to attract top ranking medical students to their programs was impaired by the presence of PR in the State of New York. These university-affiliated hospitals felt they could not

offer the same salary or the future staff positions available in other states.

E. Hospital Personnel

Eight of the ten hospitals stated that they were actively pursuing staffing cutbacks as a means of controlling costs. In all but one of these eight cases, the cutbacks were implemented through a policy of not replacing employees who retired or left for other reasons. If the position vacated was a vital one, the hospital retrained an existing employee if at all possible.

One of the eight hospitals felt the staffing cuts had already reduced the quality of care in their institution, while the others believed it could happen in the near future.

Only two of the ten hospitals we examined were unionized. Both of these felt that PR had strengthened their bargaining position with the unions. The remaining eight had a similar opinion regarding bargaining position, but they had less opportunity to experience this since the terms negotiated in the unionized hospitals seemed to strongly influence the terms in nonunionized hospitals.

Despite the difficulty employees seemed to have had negotiating compensation terms, there was low personnel turnover in the ten hospitals.

The effect of the PR system on hospital personnel does not appear to have significantly impacted HBPs. The majority of those interviewed felt that there were few problems in acquiring

needed staff. A few physicians did express concern that the policy of not hiring or replacing needed staff did, in some instances, cause delays in performing laboratory tests and result in longer lengths of stay for patients. It was also felt that, given a normal turnover rate, the policy of not replacing personnel could result in a decrease in technical competence within a hospital's laboratories.

F. Provisions with Suppliers

All ten of the hospitals indicated that they had found ways to economize in their relationships with suppliers. Some stated they were engaging in more solicitation of competitive bids. Others said they were more concerned with taking advantage of suppliers' discounts for rapid payment of invoices. Still others simply maintained that their approach was more "business-like" and less arbitrary. However, the most common means the hospitals used to minimize supplies expense was bulk purchasing. Under this arrangement many hospitals cooperated in the purchase of common, less perishable supplies and in so doing gained a volume discount from suppliers.

G. Capital Equipment

Virtually all the hospitals stated that they had limited expenditures for capital equipment in some manner and that this was at least partially the result of PR. The extent to which expenditures were limited depended upon the hospital's financial position and whether the hospital's equipment was new and modern or out-of-date and in need of replacement. In addition, the impact of this sort of expense curtailment varied from one department to the next.

All but two of the ten hospitals were limiting capital equipment expenditures. The hospitals seemed to feel that rapid technological changes and the spiraling cost of medical equipment have made the impact of such limitations severe. Due to its capital intensive nature, radiology seemed to be most sensitive to this issue. However, both administrators and HBPs in various specialties expressed concern that the hospitals' inability to update their equipment and facilities might leave them unable to deliver high quality care to their patients. They felt that out-of-date equipment or the absence of more modern equipment could impair the hospitals' ability to diagnose and treat their patients.

The two hospitals that were not severely limiting capital equipment expenditure seemed to be benefiting from fortunate circumstances. Both institutions have been in a position to substantially increase occupancy in recent years. As mentioned previously, increased occupancy is one of the best means to maintain or increase a hospital's operating revenue. Both hospitals viewed capital equipment expenditures, especially those for new services or procedures, as an investment necessary to maintain their increasing occupancy rate. In their estimate, this benefit from the PR formula, as well as improved service to their community, more than offset the impact this expense had on their cost per day.

With respect to HBPs, the restrictions on capital equipment resulting from the PR system appear to have affected radiologists to the greatest extent. This may be explained by the frequency of technological advances in this specialty. HBPs interviewed also

expressed concern that restrictions on purchasing new capital equipment would prevent hospitals from attracting physician specialists such as cardiologists who require specialized equipment.

H. Overall Hospital Comments

Nine out of the ten hospitals felt that they were controlling costs better under PR than they had been previously. They believed that the PR system had motivated them to contain costs and had given them a better ability to do so. A previously cited example of this is the hospitals' improved bargaining position with labor unions. In this sense, the PR system has been effective; however, it has also created some uneconomic behavior on the part of the hospital with respect to the total health care system. Examples of this behavior include:

- To facilitate a favorable cash flow, some hospitals have leased equipment instead of purchasing since the state required that it be depreciated over more years than the hospital could obtain as a repayment period on a loan to purchase the equipment. As a result, the hospital leased a piece of equipment that would have been cheaper to purchase.

- To prevent exceeding its cost ceiling, one hospital pressured its HBPs to go to a direct billing arrangement under which HBP compensation would no longer be a hospital cost. However, it was generally acknowledged by the sample hospitals that direct billing resulted in greater charges to the patient.

- To prevent exceeding their per diem cost ceiling, some hospitals have sought to increase the length of stay for certain patients, thereby spreading certain fixed or one-time costs over a greater number of days. While this strategy only worked if the hospital was considerably below the length of stay ceiling for its group, it still created some obvious diseconomies.

Every one of the ten hospitals interviewed maintained that the financial pressure created by PR was increasing. All ten also agreed that the rate of increase of this pressure had risen in the past one or two years. Again, virtually all of the hospitals indicated that this recent pressure from PR coincided with the advent of ceilings on costs and penalties for underutilization of service.

Eight out of the ten hospitals felt that costs in their hospital had been reduced almost as far as possible without a significant sacrifice in quality. Five of the ten contended that their nonoperating reserves had been substantially reduced during the past few years and that relying on these reserves was no longer a viable alternative.

In an attempt to put the causal problem discussed earlier into its proper perspective, we asked the hospitals to enumerate the other factors that have significantly impacted the hospitals' finances in the past seven years. The responses that turned up most frequently were:

- the rapid rate of technological change,
- the increasing cost of equipment,
- the increasing cost of malpractice insurance,
- changes in the intensity of care,
- increased cost of supplies and medicine,
- increasing cost of energy,
- compliance with ERISA and OSHA regulations,
- union contract settlements,
- increased difficulty in obtaining research grants and endowments,
- compliance with PSRO regulations, and
- New York State financial troubles.

Validation of Previous Findings and Assumptions

This subsection details the responses of administrative and financial personnel, as well as HBPs, to questions aimed at determining the validity of some of the findings and assumptions of earlier aspects of the study.

A. Conversion to FTE Earnings

In the preceding segments of this study, the working definition of one FTE has been 2,080 hours per year, or 40 hours per week. Time estimates provided by an administrative manager indicated this to be a reasonable definition of one FTE.

The data obtained from hospital administrative and fiscal personnel interviewed in the New York case studies supports the use of a 40 hour week as a reasonable basis for the calculation of an HBP's full-time equivalent units. Virtually all of the relevant responses were in total agreement with the use of the 40 hour per week FTE or believed it to be a reasonably close estimate, applicable to the majority of HBPs.

The responses of HBPs interviewed differed considerably from those of the administrative and fiscal managers. Only 25% of the HBPs interviewed considered the calculation of an HBP's FTE units, based upon a 40 hour workweek, to be reasonable. Estimates as to what constituted a reasonable HBP workweek ranged from 36 to 90 hours.

It is of interest to note that the majority (80%) of the HBPs who supported the calculation of HBP FTE units using a 40 hour

week were paid on a salary basis. This suggests that the 40 hour workweek may be more applicable to salaried HBPs. One radiologist interviewed considered a 40 hour week to be reasonable under a previous salary arrangement but a 50 to 60 hour week to apply under a newly adopted compensation arrangement.

The responses of administrative and fiscal managers indicated that it is realistic to calculate an HBP's compensation based upon an extrapolation of one hospital's data into a FTE amount of compensation. This is consistent with assumptions made in an earlier phase of the study. Concern was expressed, however, that the resultant figures would be low if the HBPs were compensated in outside private practice(s) at higher rates than those received from the hospital. Should this be the case, the study findings on FTE earnings would tend to be understated.

In general, neither administrative and fiscal managers nor HBPs expressed the opinion that a more accurate method of calculating an HBP's compensation exists or offered any alternatives. This may be interpreted to mean that while less than 100% of those interviewed supported the method of calculating an HBP's compensation employed in earlier phases of this study, it is probably the most suitable method available.

In drawing conclusions based upon data obtained in this segment of the study some qualifications are in order:

1. Many of the HBPs interviewed were department heads.
2. A discrepancy exists over what should be included in the calculation of a full-time workweek.

3. Estimates of workweeks provided by HBPs constitute self-reported data.

The first qualification is that a large percentage of the HBPs interviewed were department heads. A department head is likely to spend more time at the hospital, introducing an upward bias into an estimate of what constitutes a reasonable workweek for the calculation of an HBP's FTE units. Some HBP department heads actually specified shorter workweeks for other HBPs within their departments.

The second qualification concerns the lack of agreement among HBPs as to what should be included in calculating a full-time workweek. Several HBPs interviewed mentioned that their figures included hours they were "on call" or available as needed. This is likely to contrast with the administrative or fiscal manager's specification of the actual hours of medical coverage provided by an HBP.

The last qualification listed acknowledges the fact that estimates volunteered by HBPs as to the number of hours in their workweeks may be biased in the sense that they are self-reported data.

In general, administrative and fiscal managers interviewed supported the use of a 40 hour week as a reasonable basis for the calculation of an HBP FTE, as well as the calculation of HBP's compensation based upon an extrapolation of a hospital's data into a FTE amount of compensation. Neither the HBPs nor administrative and fiscal managers suggested a more accurate method of calculating an HBP's compensation. However, HBPs were generally opposed to the

use of the 40 hour week. In light of the qualifications discussed above, the validity of this objection should be considered carefully.

B. Benefits and Expenses of Salary Versus Percentage Arrangements

In an earlier phase of this study it was determined that one major difference between salary and other methods of payment lies in the fringe benefits provided to employees and the expenses paid from gross earnings of the percentage contractor. Overall, the findings in this segment of the study are consistent with the Segment II discussion of benefits provided by the hospital and expenses paid by HBPs.

Salaried HBPs commonly reported the following fringe benefits provided by the hospitals:

- vacation
- sick leave
- life insurance
- health insurance
- education leave
- malpractice insurance

The last item, malpractice insurance, was estimated as costing the hospitals approximately $500 - $1,000 per HBP per year for pathologists and as much as three to four times that range for radiologists and emergency room HBPs.

In this segment of the study there were five interviews with HBPs paid on a percentage basis, as opposed to thirteen interviews with salaried HBPs. Malpractice insurance was the most frequently mentioned expense to be borne by the HBP paid on a

percentage basis. Estimates of the cost of malpractice insurance to the HBP ranged from $600 to $3,000 per HBP per year.

It should be mentioned that, in addition to malpractice insurance coverage, the majority of physicians paid on a percentage basis personally bear the costs of most of those items listed above as fringe benefits for salaried HBPs. In some instances, HBPs under a percentage arrangement are also financially responsible for the provision of other needed professional staff (e.g., physician coverage while on vacation). In no case were the HBPs on percentage arrangements responsible for paying any of the operating costs of their departments.

The data obtained on fringe benefits received by HBPs paid on a salary basis and expenses borne by those on a percentage basis parallels the findings of an earlier phase of this study. Malpractice insurance was almost unanimously cited as a fringe benefit by HBPs paid on a salary basis as well as an expense borne by HBPs paid on a percentage arrangement. The emphasis placed on malpractice insurance by the latter group is likely to reflect the HBP's awareness of the escalating cost of acquiring such coverage.

It should be noted that the malpractice insurance costs quoted by the HBPs we interviewed were not nearly as significant as might have been expected in light of recent media attention. The costs in the range of $1,000 to $3,000 that were cited would seem to indicate that the specialties covered by this study are not subject to the extremely high malpractice insurance rates that have been reported for other specialties (e.g., neurosurgeons). The

conclusion is that the cost of malpractice insurance does not appear to explain any significant portion of the large difference in FTE earnings between salaried HBPs and those having percentage arrangements.

Future Considerations

A. Policy Issues

Both the hospital administrators and the HBPs seemed to be apprehensive in responding to the feasibility of various possible policy changes.

In general, both groups seemed to feel that a prohibition of percentage-type (percentage of gross or percentage of net) compensation arrangements would be reasonable. Those that disagreed on this point (usually the administrators) felt that percentage arrangements were useful in that they provided incentive for the physician to both expand the hospital's business and, under a special form of the percentage of net arrangement based on the net departmental income (revenue less all direct costs), to control their departmental costs.

There was considerably greater disagreement on the proposal to limit HBP compensation to a salary plus other legitimate expenses. In most cases, the HBPs were radically opposed to this idea and the administrators were somewhat in favor of it. Hospital administrators felt the salary arrangement would give them better control of costs and believed it would help hold down the cost of medical care to their communities. However, they were also concerned that this policy might lead to a deterioration of incentive

among the HBPs. The HBPs reacted quite negatively to this proposal and stated that this sort of limitation might motivate many HBPs to shift to a direct billing arrangement in order to maintain their professional freedom and earning potential. The strongest HBP reaction came from the pathologists who perceived themselves as being the most dependent of all the specialties upon the hospital.

The reaction to the idea of requiring the disclosure of total income met with uniform disapproval. In the vast majority of the cases, both administrators and HBPs alike felt this proposal was an unnecessary violation of the individual's privacy and would accomplish little beyond arousing the HBP's ire.

B. Future Impact of PR

With respect to the HBPs, most of the interviewees felt that PR as applied in New York State would, in the short run, limit HBP remuneration and, in the long run, would eventually drive the majority of the HBPs out of the hospital. In addition, there was general agreement that if the PR system drove the HBPs to direct billing, it would probably lead to a higher total cost for medical care. There was also some fear that specialties that had difficulty separating themselves from the hospital (primarily pathology) would eventually have trouble attracting medical students into their program of study.

With respect to the hospitals in general, those responding seemed to feel PR might lead to one or more of the following:

- drive the financially and managerially weaker hospitals into bankruptcy,
- lead to government-managed hospitals,
- drive highly qualified and motivated HBPs and hospital administrators out of the State of New York,
- force hospitals to drop their affiliation with Blue Cross,
- drive some of the better managed hospitals into bankruptcy due to an unfortunate position vis-a-vis PR (through unfortunate grouping, little potential for cost reduction, etc.), or
- adversely affect the quality of care provided by the health care system.

General Impressions

The general sentiment of the administrators seemed to indicate that PR in New York had been extensively altered from that which was originally intended in 1970. The hospitals seemed to feel that it was no more than a vehicle which the State government uses to arbitrarily reduce reimbursement to hospitals. Some administrators even went so far as to maintain that the State government had already "targeted" certain hospitals as ones that should be closed, and that all hospitals in the State were suffering from the State's attempts to force these "target" hospitals out of business. Moreover, the administrators felt somewhat helpless and overburdened with the responsibility of acting as the interface between a financially strapped State government attempting to restrict their hospital's reimbursement and their own responsibility to maintain a high quality health care system in their community. Many felt the key to cost-effective quality medical care in the hospital rested with the

physicians, and that the current PR system was driving the HBPs' and the hospitals' interests further and further apart.

Moreover, the hospital administrators and those few HBPs that were well versed in PR felt the New York State PR system was, in its current state, bound to have a negative effect upon health care in the State. However, it should be emphasized that our interviews included none with representatives of the State government. As a result, our findings only represent opinions from one side of the PR issue.

Summary of Major Findings

The responses that appeared most frequently and/or seemed most significant included:

. In terms of its impact upon the hospital-based physician, the PR system has-

  - contributed to a tendency for the hospitals to limit HBP remuneration in an effort to curtail their costs,

  - created incentive for the HBP to shift to a direct billing arrangement through limitations upon HBP remuneration as well as hospital cost ceilings,

  - helped create an atmosphere that is not conducive to attracting HBPs to the State, or retaining those that currently practice in New York, through limitations on expenditures for capital equipment, technical staff and other operating necessities.

. In terms of specific areas of impact in the hospital, hospital administrative personnel stated that the PR system has-

  - helped cause cutbacks in teaching programs through the introduction of partial reimbursement of teaching costs,

- improved the hospitals' dealings with suppliers by providing incentive to join buyers groups and take supplier discounts,

- strengthened the hospitals' bargaining position with HBPs and other hospital personnel,

- limited capital expenditures in many areas through cost ceilings,

- contributed to the cutback and elimination of service through underutilization penalties,

- contributed to increases in the cost of hospital care to patients with commercial insurance or who self-pay by forcing hospitals to increase their charges to make up for the partial reimbursement of actual costs from Blue Cross and Medicaid,

- produced behavior by the hospitals that is uneconomic in terms of the total health care system,

- contributed to the reduction of the hospitals' nonoperating reserves,

- contributed to a trend that may have a negative effect on the quality of care in some departments due to the hospitals' efforts to cut costs, and

- driven some hospitals to consider a withdrawal from their contract with Blue Cross in order to avoid partial reimbursement of actual cost.

. In terms of validating several key findings and assumptions of earlier segments of the study, we found that-

- the use of a 2,080 hour year (40 hour week) as a definition of one FTE HBP was widely accepted by administrative personnel. Only 25% of the HBPs accepted this definition; the remainder felt it should be higher.

- there was general acceptance of the approach used in Segments II, III and IV to convert all HBP compensation data to an FTE basis. No one could suggest a better approach.

- the information reported in Segment II concerning the fringe benefits received by salaried HBPs and the expenses paid by HBPs on percentage arrangements was confirmed.

- the cost of malpractice insurance premiums paid by radiologists, pathologists, and emergency room HBPs ranged from $600 to over $3,000.

- in no case did the interviewed HBPs on percentage arrangements pay for any of the significant operating expenses (e.g., non-professional payroll, supplies or capital equipment) of their departments out of the compensation they received from the hospitals.

. In terms of the acceptability of several possible policy alternatives-

- there was general acceptance among those interviewed with the prohibition of percentage arrangements. Several administrators were concerned that such a policy would eliminate incentives for HBPs to increase volume and to control costs.

- a proposal to limit HBP compensation to salary plus legitimate expenses met mixed reactions. The HBPs were consistently opposed to the proposal. Administrative personnel were generally favorable, based on improving their ability to control costs; but they were concerned again that HBP incentives would be reduced.

- there was uniform opposition to requiring disclosure of each physician's total income, based primarily on privacy considerations.

. Despite the fact that the majority of the hospitals interviewed were in relatively strong financial position, many had suffered operating losses during the past three years. Many administrators maintained that if PR continued in its current form, their hospitals' financial positions would weaken significantly.

. The three hospitals that were in a weak financial position when they were interviewed stated that if the current PR system continues, it would jeopardize their quality of care and, ultimately, their financial solvency.

. There was agreement among the hospitals that the impact of the New York PR system has become significantly more severe in the past two to three years. This development appears to be the result of the introduction of new cost ceilings and utilization penalties during this period.

HEALTH CARE FINANCING ADMINISTRATION

STUDY OF REIMBURSEMENT AND PRACTICE ARRANGEMENTS OF PROVIDER-BASED PHYSICIANS

RECOMMENDATIONS FOR FURTHER RESEARCH

Recommendations from the Descriptive and Multivariate Analyses

In this study we had access to much of the information available on hospital-based physicians (HBPs) from hospital sources. Despite this, several important questions remain unanswered. To answer them, data from other sources and, probably, totally new data will be required. The areas of most pressing need for additional data and subsequent research, particularly in radiology and pathology, are described in the paragraphs below.

The types, quantities, prices, and unit costs of the various services provided by HBPs cannot be adequately measured as of now. Such output measures as are available (i.e., exams, procedures, tests) are too aggregative and not uniformly applied across hospitals. Thus, it is very difficult to link the amount and type of compensation to the actual amounts of service provided and their cost to the public. Such information is necessary, however, before judgments can be rendered regarding the reasonableness of compensation amounts. If, for example, high compensation is associated with high productivity, this may be deemed socially desirable (although it leads to the further question of whether or not the services themselves are efficacious). To obtain the necessary output measures for a group of hospitals, special studies

and/or new reporting requirements would be necessary. This would obviously be a fairly lengthy and costly process, but one which may be required in any event by state rate review and rate setting programs and by the federal government as reimbursement procedures are tightened.

Since these segments focused on the hospital as the main source of data, HBP income from other sources was not available. We attempted to adjust for this through the use of the full-time equivalent measure, but the accuracy of this procedure is unknown. Since, in our various samples, from one-half to three-quarters of the HBPs worked less than full-time at the hospital from which we obtained data, this is, potentially, a serious problem.

In order to obtain more complete income information, other data sources will be necessary. A direct survey is unlikely to yield a very high (or very accurate) response. Internal Revenue Service data is a possibility. Also, it may be possible to use Medicare and Medicaid data to identify the various practice sources (i.e., which hospitals, private practices, etc.) from which individual HBPs obtain income from these programs. It might then be possible to obtain estimates of additional HBP incomes derived from these sources.

Also needed are better estimates of the actual number of hours worked by HBPs and the nature of that work (e.g., patient care, administration, teaching). However, such information may be impossible to obtain without some form of direct observation or time measurement study. This would also seem to imply an intensive

study of a small number of HBPs, in which case the generalizability of the results would be open to question.

Direct measures of fringe benefit costs and other expenses paid by HBPs who are on percentage arrangements are also needed in order to verify our conclusion that the difference in amount of compensation between those on percentage and those on a salary arrangement was greater than could be attributed to these extra expenses. This is one area on which information might be fairly easy to obtain directly from the HBP (for instance, via a survey).

Another possible subject for further research concerns HBP motivation and incentives under various types of contractual arrangements. Further study in this area could attempt to answer such questions as:

- Why do HBPs seek (or accept) one type of contractual arrangement over another?
- What factors influence changes in contractual arrangements?
- Does the type of contractual arrangement affect HBP behavior in such areas as-
  - number of hours worked,
  - productivity, and
  - allocation of time to patient case, administration, research, teaching, etc.?

These questions involve a variety of complex issues which would be very difficult to quantify. However, answers to such questions would be extremely useful in the policy-making process.

The impact of interns and residents tends to complicate any analysis of HBPs in teaching hospitals. Although the direct

salary costs associated with interns and residents is usually available, it is often difficult to determine how their time (and its cost) is allocated throughout the hospital. As a result, it is difficult to quantify the impact of interns and residents on the productivity of any department. In our study, interns and residents were excluded from both compensation amounts and counts of HBPs and FTEs. Further study of the compensation levels of interns and residents and, more importantly, of their impact on departmental volumes and, indirectly, on HBP compensation, could be very valuable.

Finally, we believe that as major changes are contemplated in the way HBPs are reimbursed under public programs (such as the proposed Talmadge Bill), all major new policies should be pretested under controlled conditions before being implemented on a nationwide basis. The great variety of compensation arrangements now in existence, coupled with the administrative complexity of implementing limits or controls of various types on amounts of compensation, necessitates, we believe, a cautious approach. Potential new approaches should be tested experimentally, if possible. If this is not possible, then the use of in-depth interviews with intermediaries, hospital administrators, HBPs, and other affected parties may give some important clues as to the probable effects of proposed changes. Such information should form an essential ingredient in the design of new reimbursement procedures.

Recommendations from Exploratory Case Studies of Prospective Reimbursement in New York State

In the last segment of the study, it was found that the prospective reimbursement (PR) system in the State of New York has had a pronounced effect upon some of the HBPs and hospitals studied. This effect and the ramifications it might have for the health care system in the State of New York (and/or other states with PR systems) could be researched further in several areas.

One area for possible research is the tendency for the HBPs in New York State to shift to direct billing as the pressure to curtail hospital costs is increased. If this trend were to continue, the physician component of the cost of hospital care would become more and more difficult to control. This might result in higher total health care costs to the public. In addition, while this trend may be more pronounced in New York State and other areas in the Northeast (where direct billing arrangements are less common than in the other regions), future attempts to regulate these costs will have to take this trend into consideration.

A study of this issue would have to be considerably more extensive than the exploratory case studies we conducted in New York State. The recommended study might have some of the following characteristics:

- is conducted in several states that have had PR systems in place for at least 3-5 years.
- spans several years before and after the introduction of PR.

- analyzes the viewpoints of physicians, hospital administrative personnel, third-party intermediaries, and the state agency(ies) responsible for administering the program.

- emphasizes changes in HBP contractual arrangements and the motives behind these changes.

- quantifies HBP earnings and the total price paid by all payors before and after each change in contractual arrangements.

The scope of such a study could be expanded to address one or more of the additional areas for further research that are briefly discussed in the subsequent paragraphs.

A second area is that of the HBPs' inadequate knowledge of the PR system and its purpose. As mentioned in Segment V, the HBP is relatively uninformed about PR and therefore has difficulty coming to grips with its constraints and incentives. In its current state, PR creates a confrontation between the hospital administrator and the HBP that might have a significant impact on the health care system. Further study in this area could address such issues as: quantifying the extent of HBP knowledge of PR, identifying how lack of knowledge could affect HBP - hospital relationships, outlining a PR education program for HBPs, and identifying the potential benefits of such a program.

Third, further study might be directed toward the effect PR has had upon the various payors. As noted previously, some hospitals have considered terminating their contracts with Blue Cross, and some administrators claimed that the patient with commercial insurance, or who self-pays, is forced to pay higher

rates for hospital service due to partial reimbursement of actual costs under PR. A future study could analyze, for example, changes over time in the mix of revenue sources versus the patient mix, the extent to which each class of payor is under- or over-reimbursing actual costs, and changes over time in the types of insurance coverage accepted by hospitals.

A fourth area that might warrant further study is that of the overall financial condition of the hospitals in New York State. As described in Segment V, many of the hospitals are being weakened financially as a result of PR and others could be near insolvency in a few years. Financial condition could be studied by analyzing trends in areas such as (a) operating income or loss, (b) income or loss after nonoperating revenues and expenses, (c) endowment and other nonoperating funds, and (d) financial ability to replace fixed assets.

The final area for further investigation is that of the effect PR has had upon quality of care in the State. The hospitals have cut back in many areas in an attempt to reduce costs. Many of the interviewees felt that this will or already has significantly affected quality of care. Any research of this nature would require the development of an acceptable definition of quality medical care, a problem which has perplexed health care researchers for years.

These and other areas can and should be investigated. These case studies of PR in New York State have revealed a multitude of variables that should be carefully evaluated by the health care policymaker.

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